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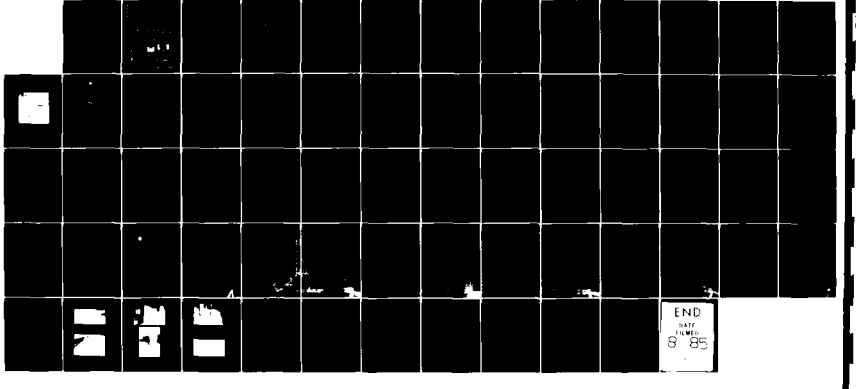

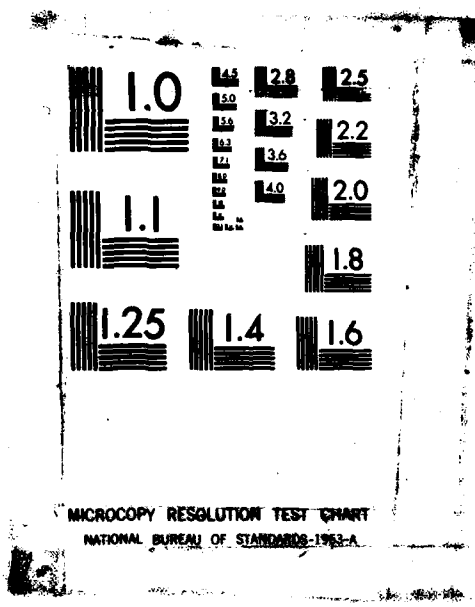
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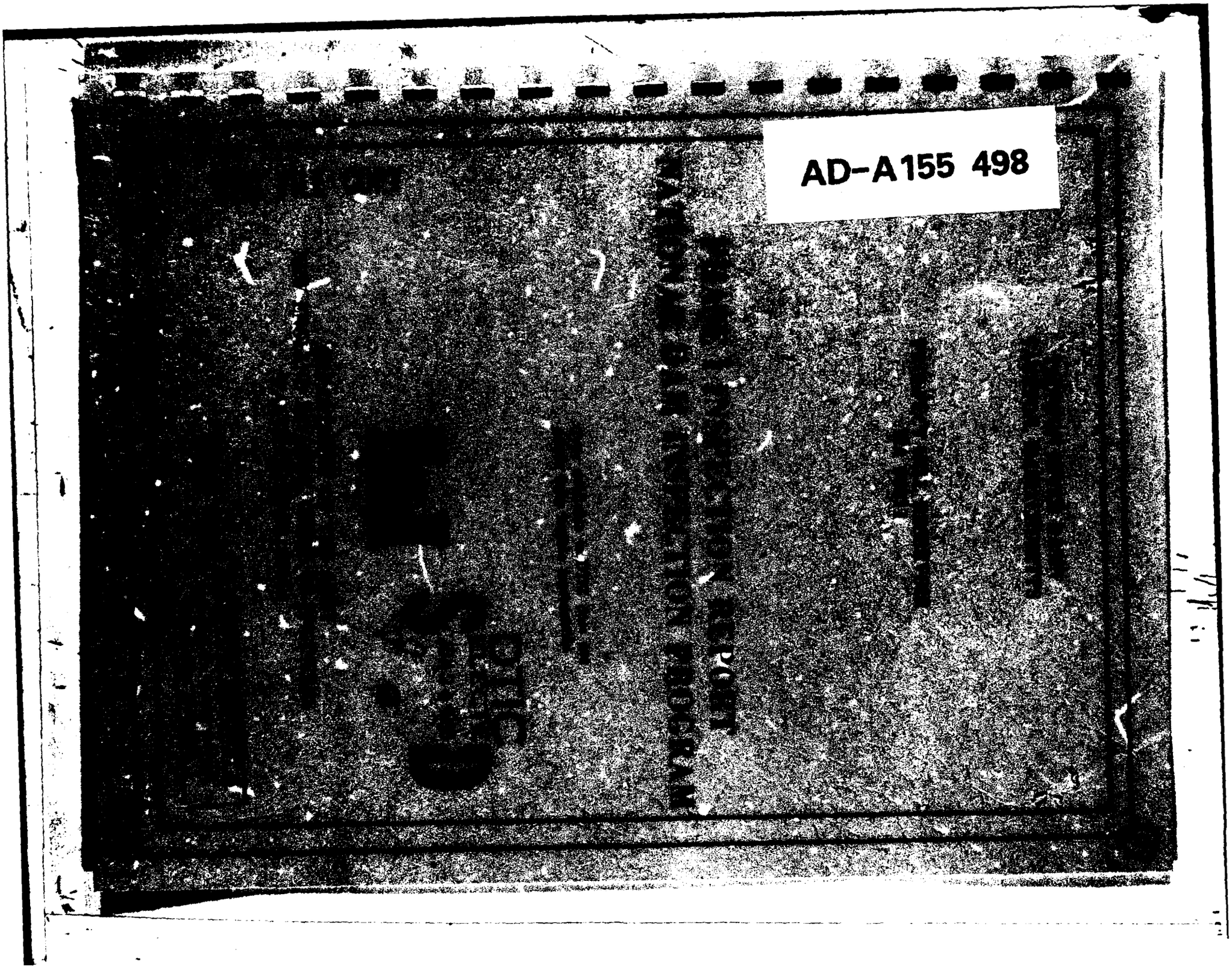
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19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,

Taunton River Basin
Taunton, Massachusetts
None-surface drainage to tributaries of Taunton River

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The dam measures 604 ft. by 274 ft. It is impounded by a rectangular, concrete lined earth embankment. It provides storage and equalizing pressure for the Taunton Water supply system. There is need for maintenance and monitoring to assure the continued performance of this reservoir and embankment. The reservoir and embankment are generally in good condition and well maintained.

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REPLY TO
ATTENTION OF:
NEDED

JUN 18 1979

Honorable Edward J. King
Governor of the Commonwealth of
Massachusetts
State House
Boston, Massachusetts 02133

Dear Governor King:

I am forwarding to you a copy of the Prospect Hill Reservoir Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Department of Environmental Quality Engineering, the cooperating agency for the Commonwealth of Massachusetts. In addition, a copy of the report has also been furnished the owner, Taunton Water Works, City Hall, Room 9, Taunton, Massachusetts 02780.

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Quality Engineering for your cooperation in carrying out this program.

Sincerely yours,

JOHN P. CHANDLER
Colonel, Corps of Engineers
Division Engineer

Incl
As stated

PROSPECT HILL RESERVOIR

MA 00811

TAUNTON RIVER BASIN
TAUNTON, MASSACHUSETTS

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION
PROGRAM

NATIONAL DAM INSPECTION
PROGRAM

PHASE I INSPECTION REPORT

BRIEF ASSESSMENT

Identification No.: MA00811

Name of Dam: Prospect Hill Reservoir

Town: Taunton

County and State: Bristol County, Massachusetts

Stream: None - surface drainage to tributaries of Taunton River

Date of Inspection: November 30, 1978

Prospect Hill Reservoir is impounded by a rectangular, concrete-lined earth embankment. The reservoir, which was built in 1956, measures 604 feet by 274 feet. The embankment is about 1,200 feet long with a maximum height of 25 feet and side slopes at 2:1 (horizontal to vertical). The concrete rim of the reservoir is at elevation (El) 194.0, and the crest of the embankment varies from El 192.9 to 193.2.

Prospect Hill Reservoir provides storage and equalizing pressure for the Taunton water supply system. Two pipelines lead to a gate house located on the south side of the reservoir. These lines branch into four 20-inch conduits which carry flow into and out of the reservoir. Water is pumped into the reservoir at certain times of the day, and then allowed to flow out on demand. The operational high water level is at El 192.0, resulting in a maximum storage capacity of 22 million gallons (mil. gal.).

There are two high-level overflow drains and two low-level drains which connect to a single 12-inch outlet conduit. The two high-level outlets are 12-inch overflow pipes set vertically with rims at El 192.5. The two low-level outlets are 12-inch drain pipes with inverts at El 162.0. The outlet conduit

leads 200 feet downhill to an overflow pond with 1 mil. gal. capacity. The overflow pond has no outlet and water overflows the embankment into a ditch along Prospect Hill Street and eventually to Prospect Hill Pond.

There is a need for maintenance and monitoring to assure the continued performance of this reservoir and embankment. This conclusion is based upon the visual inspection at the site, the available engineering data, and past performance history. According to the Corps of Engineers guidelines on classification of hazard potential, the reservoir has been placed in the "significant" hazard category.

The reservoir and embankent are generally in good condition and well maintained. The following deficiencies were observed at the site: growth of trees on the slopes of the embankment, slight leakage from some joints on the conduits, and leakage from a gate valve into the outlet conduit. It was also noted that a greater than expected amount of seepage is occurring in the underdrain system.

Hydraulic analyses indicate that the two 12-inch overflow drains can discharge an estimated flow of 15.1 cubic feet per second (cfs) with the water surface at El 194.0 which is the top of the rim of the reservoir. An outflow test flood of 7.7 cfs (one-half the probable maximum flood (PMF))at El 192.9 will not overflow the reservoir. Under normal operating conditions, the reservoir can discharge 100 percent of the test flood without overflowing the rim.

It is recommended that the Owner selectively remove trees from the embankment, repair leakage from the conduits, repair the gate valve on the outlet, and monitor and measure the seepage from the underdrain system. The Owner should also implement a regular program of technical inspections.

The remedial measures outlined above and in Section 7 should be implemented by the Owner within a period of 2 years after receipt of this Phase I Inspection Report.

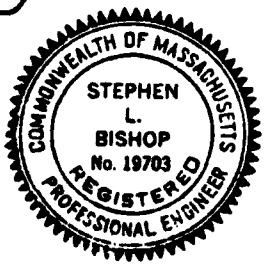
Edward M. Greco, P.E.
Project Manager
Metcalf & Eddy, Inc.

Connecticut Registration
No. 08365

Approved by:

Stephen L. Bishop, P.E.
Vice President
Metcalf & Eddy, Inc.

Massachusetts Registration
No. 19703



This Phase I Inspection Report on Prospect Hill Reservoir has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

Joseph A. McElroy

JOSEPH A. MCELROY, MEMBER
Foundation & Materials Branch
Engineering Division

Carney M. Terzian

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

Joseph W. Finegan, Jr.

JOSEPH W. FINEGAN, JR., CHAIRMAN
Chief, Reservoir Control Center
Water Control Branch
Engineering Division

APPROVAL RECOMMENDED:

Joe B. Fryar

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in Recommended Guidelines for Safety Inspection of Dams, for a Phase I Investigation. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigations, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general conditions and the downstream damage potential.

PROSPECT HILL RESERVOIR

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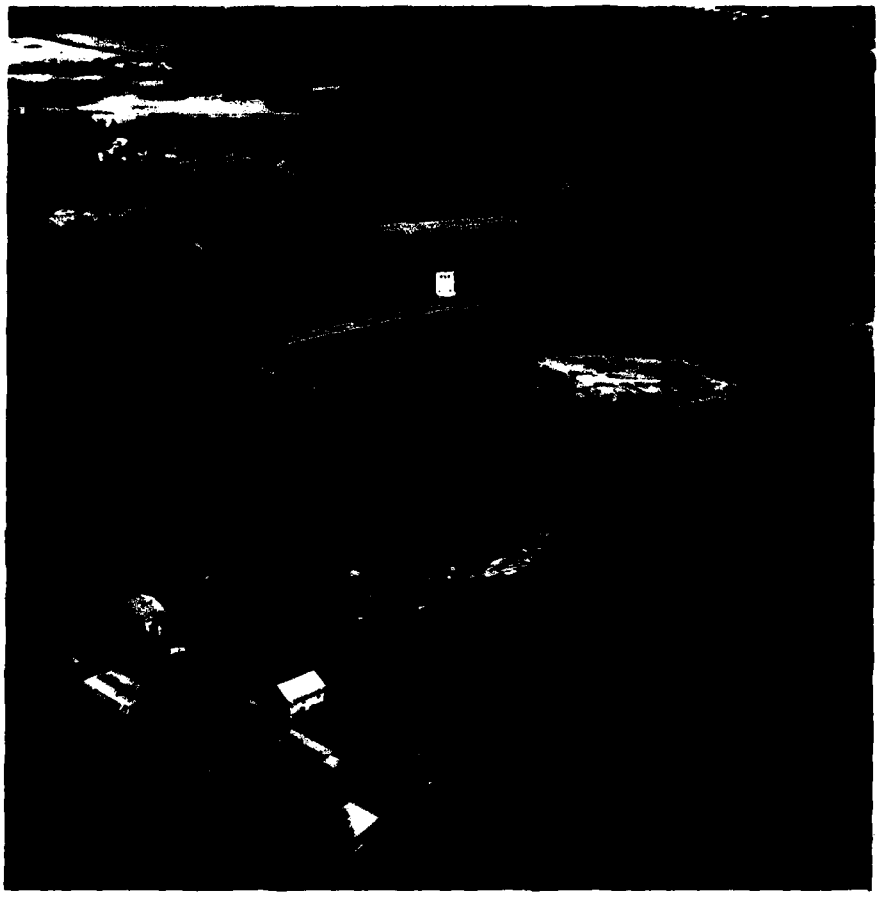
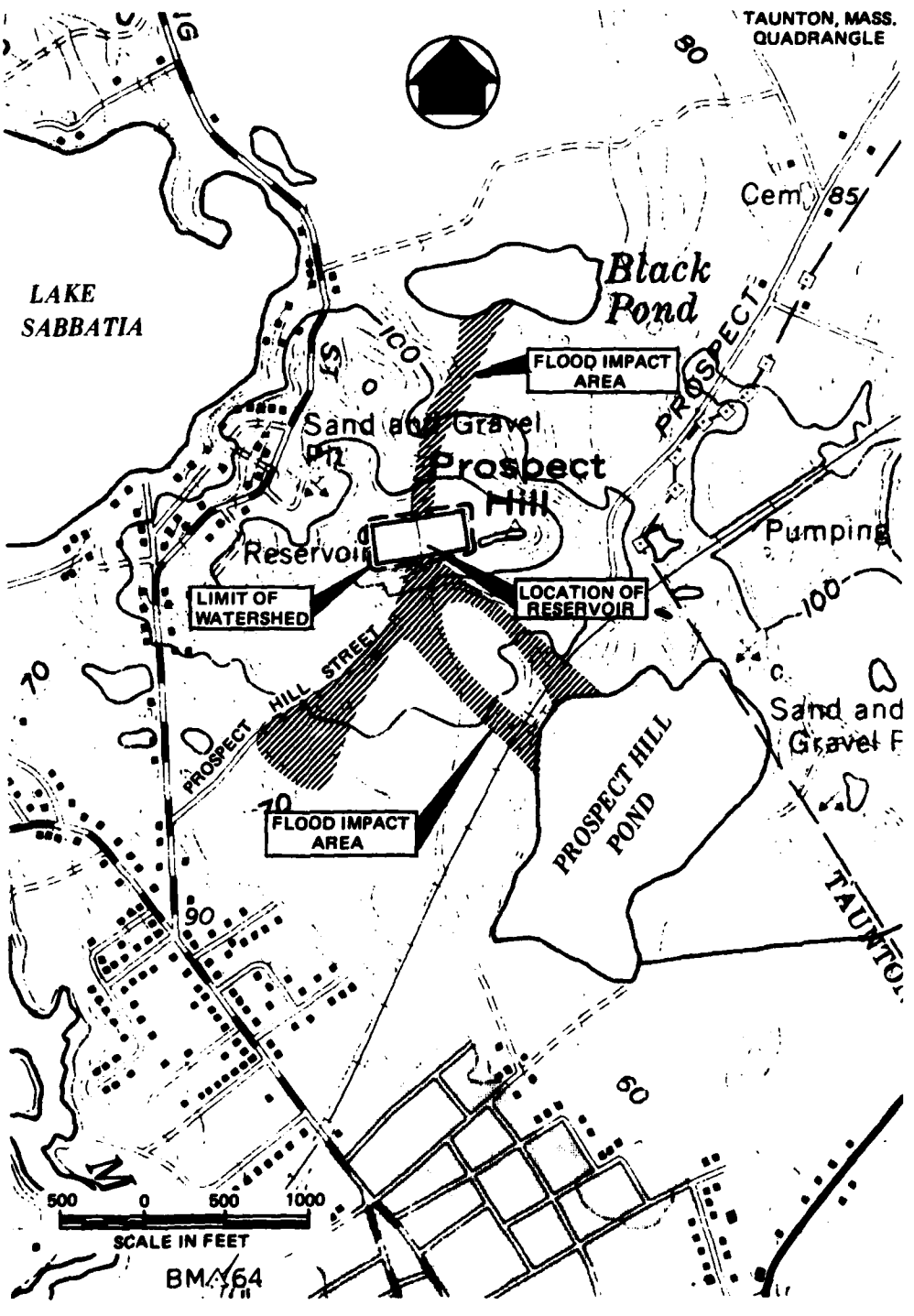
PROSPECT HILL RESERVOIR
TAUNTON, MASSACHUSETTS





LOCATION MAP – PROSPECT HILL RESERVOIR

NATIONAL DAM INSPECTION
PROGRAM

PHASE I INSPECTION REPORT

PROSPECT HILL RESERVOIR

SECTION 1

PROJECT INFORMATION

1.1 General

a. Authority. Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a national program of dam inspection throughout the United States. The New England Divison of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Metcalf & Eddy, Inc. has been retained by the New England Division to inspect and report on selected dams in the State of Massachusetts. Contract No. DACW 33-79-C-0016, dated November 28, 1978, has been assigned by the Corps of Engineers for this work.

b. Purpose:

(1) Perform technical inspection and evaluation of non-Federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-Federal interests.

(2) Encourage and assist the States to initiate quickly effective dam safety programs for non-Federal dams.

(3) Update, verify and complete the National Inventory of Dams.

1.2 Description of Project

a. Location. The reservoir is located on Prospect Hill in the City of Taunton, Bristol County, Massachusetts (see Location Map).

b. Description of Dam and Appurtenances. Prospect Hill Reservoir is impounded by a rectangular, concrete-lined earth embankment (see Figures B-1 through B-4). The reservoir is 604 feet long by 274 feet wide and is separated into two sections by a concrete wall. The reservoir has a flat bottom with inside slopes of 2:1 (horizontal:vertical), and a 1-foot high, vertical concrete wall around the rim. Two 6-inch underdrains are located beneath the center of the reservoir. Contract drawings show that the top of the rim of the reservoir is at El 194.0 and the bottom is at El 167.0. The operational high water level of the reservoir is at El 192.0

The earth embankment is about 1,200 feet long and encompasses most of the reservoir (see Figure B-2). Sections of the reservoir were excavated into natural ground at the northwest corner and for portions of the north and east sides. The height of the embankment varies, depending on the elevation of the natural ground surface, up to a maximum height of about 25 feet at the gate house. The crest of the embankment is about 7 feet wide and varies from El 192.9 to 193.2. The outside slope is at 2:1 and is covered with grass and some planted pine trees. A typical embankment section is shown on Figure B-3.

Prospect Hill Reservoir provides storage and equalizing pressure for the Taunton water supply system. Controls for the conduits transmitting flow into and out of the reservoir are located in a combined screen, chlorination and gate house on the south side of the reservoir (see Figures B-5 and B-6). Two water supply pipelines, 20 inches and 24 inches in diameter, lead into the gate house. These branch into two 20-inch inflow and two 20-inch outflow cast-iron conduits. The inflow conduits lead from the gate house, through the embankment and diagonally across the floor of the reservoir to the northwest and northeast corners (see Figure B-2). The outflow conduits lead from the floor of the reservoir to the screen house, where 20-inch square sluice gates control flow into two sections. There is also a 20-inch square

sluice gate regulating flow between the two sections. Two 20-inch outflow conduits then lead from the screen house into the gate house where thay connect into the water supply pipelines. The direction of flow through the conduits is controlled by check valves in the gate house (see Figure B-5). Each conduit also has a manually-operated gate valve. The invert of the conduits is shown on the drawings at El 167.0 on the bottom of the reservoir and at El 165.9 in the gate house.

Two high-level overflow drains and two low-level drains connect to a single 12-inch diameter conduit which conveys flow from the gate house to an overflow pond. The high-level outlets are 12-inch, cast-iron overflow pipes located in each section of the screen house. The two high-level outlets are set vertically and are shown on the drawings with rims at El 192.5. This elevation is 1/2 foot above the operational high water level. The low-level outlets are two 12-inch, cast-iron drain pipes leading from the bottom of each section of the screen house. They are controlled by hand-operated gate valves in the gate house and are shown on the drawings with inverts at El 162.0. The four 12-inch outlets connect into a 12-inch, cast-iron outlet conduit which discharges into the overflow pond. The invert of the outlet conduit is at El 130.5 where it enters the pond.

About 200 feet southwest of the gate house is a 1 mil. gal. capacity overflow pond. The pond is about 210 feet long, 90 feet wide, and 6 feet deep. An earth dike has been constructed around the southern half of the pond. The crest of the dike varies from El 135.5 to 136.0. The sides slope at 2:1 (see Sections Through Blow-off Basin, Figure B-3). The overflow pond receives water from the 12-inch outlet conduit and a 6-inch underdrain from beneath the reservoir lining. There is no outlet for the pond and, if it becomes full, water overflows the dike and flows in an open ditch along Prospect Hill Street.

c. Size Classification. Prospect Hill Reservoir is classified in the "small" category since the embankment has a maximum height of 25 feet, and the reservoir has a maximum storage capacity of 77 acre-feet.

d. Hazard Classification. The reservoir is located on top of a hill about 3,000 feet north of thickly developed areas of Taunton. The area on the north side of Prospect Hill is undeveloped and leads to a broad lowland area where Black Pond and a swamp are located. The area on the south side of Prospect Hill is mostly undeveloped and leads to a swamp and Prospect Hill Pond. There is light residential development along Prospect Hill Street, beginning about 600 feet southwest of the reservoir.

In the event of complete failure of the reservoir, it is unlikely that extensive property damage would occur or that more than a few lives would be lost. Accordingly, the dam has been placed in the "significant" hazard category.

e. Ownership. The reservoir is owned by the Taunton Water Works, City Hall, Room 9, Taunton, Massachusetts 02780. Mr. Joseph Sousa, Superintendent, (telephone 824-5859) granted permission to enter the property and inspect the reservoir.

f. Operators. The reservoir is operated by personnel from the Taunton Water Works. The gate valves on the inflow and outflow conduits as well as the slide gates in the screen house are kept open. However, personnel inspect the gate house and reservoir at least once each day.

g. Purpose of Dam. The reservoir is used to store water and equalize pressure for the City of Taunton water supply system. Water is pumped into the reservoir during periods of low demand or when the water level is low. Water is used from the reservoir during periods of high demand. The capacity of the reservoir at the operational high water level (El 192.0) is 22 mil. gal.

h. Design and Construction History. The reservoir, embankment and overflow pond were constructed in 1956 by R. Zoppo Construction Co. of Norwood, Massachusetts. The facility was designed by Fay, Spofford & Thorndike, Inc. of Boston, Massachusetts. The construction specifications refer to ASTM standards for concrete, cement, reinforcing and other materials. Material for the earth embankment was obtained from cut sections around the reservoir. This material was reportedly sandy gravel, which agrees with what is shown in the construction photographs. The foundation beneath the reservoir is also sandy gravel. Borings were taken prior to construction, although the logs are no longer available. Fay, Spofford & Thorndike, Inc. provided full-time inspection during construction of the project. The structures are built essentially as shown on the drawings, and no signficant post-construction changes have been made.

A plastic floating cover has been designed for the reservoir and is expected to be constructed in the summer of 1979. The cover will rise and fall with the fluctuating water level and will help to keep debris out of the water. The cover was designed by Shevalier Engineers of Raynham, Massachusetts.

i. Normal Operating Procedures. Pumps transmitting water to the reservoir are operated to maintain a water level at about El 192.0. The maximum pumping rate is 13.9 cfs from the two pumps located at an off-site pumping station. Personnel at the pumping station monitor the reservoir level and pumping rates 24 hours a day.

The gates valves for the inflow and outflow conduits and the sluice gates in the screen house are kept open. The facilities are checked daily by personnel from Taunton Water Works. All gates and fittings are greased and checked every six months. Occasionally, when debris in the reservoir needs to be cleaned out, one section is drained using the low-level outlet. One side was cleaned three years ago and the other cleaned eight years

ago. Doors into the gate house and screen house are kept locked and the access road from Prospect Hill Street has a locked gate.

1.3 Pertinent Data

a. Drainage Area. The reservoir is located on top of a hill with its rim above the surrounding ground. Surface runoff drains away from the reservoir to the north and south. The drainage area, therefore, consists only of the surface area of the reservoir (see Location Map). This drainage area (reservoir area) is 3.77 acres (0.006 square miles).

b. Discharge. Normal discharge is through two 20-inch conduits which extend from the bottom of the reservoir through the southern embankment and into a screen house. These conduits are about 65 feet long and have an upstream invert at El 167.0. There are two sluice gates at the screen house which control flow through the conduits. From the screen house, two 20-inch conduits carry flow through the gate house and into 20-inch and 24-inch water supply pipelines. The invert of the conduits is at El 165.9 in the gate house. Flow is normally controlled by check valves, but hand-operated gate valves are also present in the gate house.

If the water in the reservoir rises above the normal high level, two 12-inch overflow drains in the screen house would carry flow to a 12-inch outlet conduit in the gate house. The rims of the overflow drains are at El 192.5. The outlet conduit leads 200 feet downhill and into an overflow pond with 1 mil. gal. capacity. The downstream invert of the outlet conduit is at El 130.5. If the pond becomes full, water overflows into a 2-foot wide ditch along Prospect Hill Street. This ditch leads to a culvert beneath the road and into a swamp which drains into Prospect Hill Pond.

The 12-inch overflow drains can discharge an estimated 15.1 cfs with the water surface at El 194.0 which is the top of the rim of the

reservoir. Under normal operating conditions, an outflow test flood (one-half the PMF) of 7.7 cfs at El 192.9 will not overflow the rim of the reservoir.

The reservoir was built in 1956 and has never reportedly overflowed. The water level, which is controlled by pumping, is recorded in the pumping station. The maximum reservoir level is recorded to be 192.5.

c. Elevation (feet above Mean Sea Level (MSL)). A benchmark was established at El 194.0 on the top of the concrete wall dividing the reservoir. This elevation was shown on drawings of the reservoir dated 1954 (see Figure B-3).

(1) Top dam: 193.9 to 194.0 - top of concrete wall
192.9 to 193.2 - top of earth embankment

(2) Test flood pool: 192.9

(3) Design surcharge (1954 design): 192.5 rims of overflow pipes

(4) Full flood control pool: Not Applicable (N/A)

(5) Recreation pool (operational pool): 192.0

(6) Spillway crest: None (overflow drains at El 192.5)

(7) Upstream portal invert diversion tunnel: None

(8) Stream bed at centerline of dam: N/A

(9) Maximum tailwater: N/A

d. Reservoir

(1) Length of maximum pool: 300 feet

(2) Length of recreation pool (operational pool): 300 feet

(3) Length of flood control pool: N/A

e. Storage (acre-feet)

(1) Test flood surcharge (net): 3.4 at El 192.9

(2) Top of dam: 77 at El 194.0

(3) Flood control pool: N/A

(4) Recreation pool (operational pool): 70

(5) Spillway crest: N/A

f. Reservoir Surface (acres)

*(1) Top dam: 3.8

*(2) Test flood pool: 3.8

(3) Flood-control pool: N/A

(4) Recreation pool (operational pool): 3.8

(5) Spillway crest: N/A

g. Dam (earth embankment and reservoir)

(1) Type: earthfill

(2) Length: 1,200 feet

(3) Height: maximum 25 feet

(4) Top width: 7 feet

(5) Side slopes: 2:1

(6) Zoning: None

(7) Impervious core: None

(8) Cutoff: concrete lining on inside slopes

(9) Grout curtain: None

*Based on the assumption that the surface area will not increase significantly with changes in reservoir elevation from 192.0 to 192.9.

i. Spillway. There is no spillway at this site. Normal discharge is carried by two 20-inch conduits leading to 20-inch and 24-inch water supply mains. Overflow and drawdown are carried by a 12-inch outlet conduit leading to an overflow pond.

j. Regulating Outlets. Under normal conditions, the water level is regulated by two water supply pipelines which lead into and out of the reservoir. These pipelines split into two 20-inch inflow and two 20-inch outflow conduits in the gate house. Check valves on the conduits direct the flow, and gate valves are present to stop flow when necessary. The invert of the conduits in the gate house is at El 165.9.

Water in the reservoir can be drawn down through a 12-inch, cast-iron conduit which leads from the gate house to an overflow pond about 200 feet downhill. Flow enters the conduit through two 12-inch gated low-level drains leading out of the screen house. The invert of the pipes is at El 162.0 at the screen house. The invert of the outlet conduit is at El 130.5 in the overflow pond.

SECTION 2

ENGINEERING DATA

2.1 General. There are 45 sheets of contract drawings dated September, 1954, available from Taunton Water Works and from Zoppo Construction Co. These drawings show plans and sections of the reservoir, gate house, overflow pond, and appurtenances. Copies of five selected drawings are included in Appendix B (Figures B-2 through B-6). Copies of the construction specifications and a set of 8-inch by 10-inch photographs taken during construction are available from Fay, Spofford & Thorndike, Inc.

Drawings showing the design of the proposed floating cover for the reservoir are available from Shevalier Engineers of Raynham, Massachusetts. No hydraulic computations or construction records are available from the Owner, County or State agencies relative to the design and construction of this reservoir.

We acknowledge the assistance and cooperation of the following people: Messrs. John Hannon and Joseph Iagallo of the Massachusetts Division of Waterways; Mr. Albert Lounsbury of the Massachusetts Department of Public Works; Messrs. Joseph Sousa and Manuel Souza of the Taunton Water Works; Mr. Clifford Mansfield of Fay, Spofford & Thorndike, Inc.; and Mr. Tom Zoppo of Zoppo Construction Co.

2.2 Construction Records. The only construction records available are the contract drawings, specifications and photographs referred to in Section 2.1. The drawings are noted as being revised to as-built drawings in July, 1956. Copies of five selected sheets are included in Appendix B.

2.3 Operating Records. Records of the water level, pumping rates and hours of pumping are kept by personnel at the pumping station. Personnel are at the station 24 hours a day and manually record the pumping data and water level every four hours.

2.4 Evaluation

a. Availability. There are as-built drawings, construction specifications and operating records available for the reservoir.

b. Adequacy. The lack of hydraulic and structural computations and detailed construction records did not allow for a definitive review. Therefore, the evaluation of the adequacy of the reservoir is based on review of available drawings, visual inspection, past performance history, and engineering judgment.

c. Validity. Comparison of the as-built drawings with the field survey conducted during the Phase I inspection indicates that the available information is valid.

SECTION 3

VISUAL INSPECTION

3.1 Findings

a. General. The Phase I Inspection of the Prospect Hill Reservoir was performed on November 30, 1978. A copy of the inspection checklist is included in Appendix A. A brief inspection of the reservoir was made by personnel from the Department of Public Works in January, 1978. The only deficiency noted in the report was the growth of pine trees on the outside slopes of the embankment.

b. Dam (reservoir and embankment). Prospect Hill Reservoir is a rectangular, concrete-lined structure with an earth embankment around most of its perimeter. The reservoir and embankment are generally in good condition. The visible concrete lining is slightly discolored and eroded below the operational high water level. Joint filler is missing from most of the expansion joints between the concrete slabs. Two 6-inch underdrains are located beneath the reservoir lining. Personnel from the water company reported that leakage through the lining is greater than expected, based on observed flows from the underdrains. A 2-foot high, corrugated asbestos fence, which serves as a rodent barrier, is located on the rim of the reservoir. The fence has been repaired in several areas due to vandalism.

The embankment is constructed of random earth fill and serves to support the sides of the reservoir. The outside slope is at 2:1 and is covered with grass; some areas were planted with pine trees for erosion control. Minor surface erosion was noted in places. No seepage or settlement of the embankment was visible.

c. Appurtenant Structures. There is no spillway at this site. Conduits leading into and out of the reservoir are controlled by a combined screen house and gate house located on the

south side of the reservoir. The building is made of concrete and is in good condition. The conduits are made of cast-iron with bell and spigot joints. Minor staining and leakage was observed at some joints. Seepage and staining was also visible where conduits extend from the wall in the screen house to the gate house.

About 200 feet below the gate house is an overflow pond constructed with a bermed earth dike around about half of its perimeter. The pond receives flow from a 6-inch underdrain and a 12-inch outlet conduit. There is no outlet for the pond, and water was slightly overflowing the dike at the time of inspection. This is mainly due to discharge from the underdrain. However, the outlet conduit is also reportedly discharging due to leakage from a gate valve. The crest and slope of the dike are covered with grass. There are also two small trees growing on the crest. The slope and crest are locally eroded where water has overtopped the dike, and the water is flowing downhill in a ditch along the toe of the slope. There is no riprap protection for the slope of the dike or the sides of the ditch along Prospect Hill Street.

d. Reservoir Area. The reservoir is located on the top of a hill and the drainage area is limited to the surface area of the reservoir. Prospect Hill, which is generally undeveloped and wooded, has a maximum elevation at about El 200 with steep slopes of 12 to 25 percent. A sand and gravel pit is located northwest of the reservoir about halfway down the hill. Some residential development occurs near the bottom of the hill to the west and southwest of the reservoir.

e. Downstream Channel. There is no discharge channel or stream at this site. Normal discharge flows into two water supply pipelines leading out of the gate house. Overflow and drawdown is transmitted to a pond downhill from the gate house. Water overflowing the pond discharges downhill along Prospect Hill Street in a 2-foot wide, unlined, open ditch for a distance of about 1,200 feet. Flow in

the ditch enters a culvert beneath the road which leads to a broad, swampy area draining into Prospect Hill Pond.

In the event of failure of the reservoir and embankment, water would flow downhill, either toward Prospect Hill Pond if the break occurs on the south side of the reservoir, or towards Black Pond if the failure occurs on the north side of the reservoir (see flood impact area shown on the Location Map).

3.2 Evaluation. The above findings indicate that the reservoir is in good condition. The facility is generally well maintained, however, there are some items which require attention. Recommended measures to improve these conditions are stated in Section 7.3.

SECTION 4

OPERATING PROCEDURES

4.1 Procedures. Pumps are operated from an off-site pumping station to maintain the reservoir pool at El 192.0. Personnel at the pumping station monitor the water level and pumping rates 24 hours a day. Two pumps are used, at a combined maximum flow of 13.9 cfs (9 mgd).

The gates of the conduits leading into and out of the reservoir and the sluice gates in the screen house are kept open. The gate valves are checked every six months. The reservoir and appurtenant structures are visually inspected daily by personnel from the Taunton Water Works. The access gate, screen house and gate house are kept locked. A daily record of the water level is maintained by personnel at the water treatment plant.

4.2 Maintenance of Reservoir and Embankment. The reservoir and embankment are well maintained. However, pine trees are growing on areas of the embankment slope.

4.3 Maintenance of Operating Facilities. The screen house and gate house are well maintained. However, leakage is occurring from some joints on the piping and from a gate on the outlet conduit.

4.4 Description of Any Warning System in Effect. The water level in the reservoir is continuously recorded on a chart and read every four hours at the pumping station. If the water level exceeds El 192.0, the pumps are shut down. Personnel are at the pumping station 24 hours a day.

4.5 Evaluation. There is a regular program of maintenance inspections and surveillance for Prospect Hill Reservoir. Technical inspections should be conducted on a regular basis, as recommended in Section 7.3.

SECTION 5

HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features

a. General. Prospect Hill Reservoir is located on top of a hill and provides equalizing pressure and storage for a city water supply. The drainage area for the reservoir consists only of its surface area. The reservoir is a rectangular, concrete-lined structure with a rim at El 194.0. An earth embankment supports the sides of the reservoir. The embankment ties into the natural hillside and varies in height to a maximum of 25 feet. The outside slopes are at 2:1, and the crest is at about El 193.0.

The reservoir level is controlled by pumping at a nominal maximum rate of 9 mgd (13.9 cfs). The pool level is monitored at the pumping station, and the pumps are shut down when the water level reaches El 192.0. Overflow is through two ungated, 12-inch drains, one for each half of the reservoir. These drains have rims at El 192.5. The overflow drains lead to a single 12-inch outlet conduit.

b. Design Data. There are no hydraulic or hydrologic computations available for the design of the reservoir.

c. Experience Data. The water level is continuously recorded on a chart and manually recorded every four hours. The maximum recorded water level was at El 192.5. The reservoir has not overflowed since its construction in 1956.

d. Visual Observations. The reservoir and embankment are generally well maintained. The facility is inspected daily. The overflow pipes are contained in a screen house. The water level in the reservoir is monitored 24 hours a day by personnel in the pumping station.

A detailed discussion of the condition of the reservoir and embankment is presented in Section 3, Visual Inspection.

e. Test Flood Analysis. According to the Corps of Engineers' guidelines, the reservoir has been placed in the "small" size category and in the "significant" hazard category.

The Test Flood (one-half the PMF) inflow to 3.8 acres of reservoir consists of direct precipitation of 9.5 inches in six hours, assuming no losses. The Test Flood analysis consisted of determining the maximum rise in water level due to this rainfall and evaluating the effect of uncontrolled pumping. The analysis is based on a pool level starting at El 192.5 (rim of overflow drains) and assumes no outflow into the water supply pipelines.

Hydraulic analyses indicate that the overflow drains can discharge an estimated flow of 15.1 cfs when the reservoir level is at El 194.0 which is the top of the rim. The Test Flood produces a maximum outflow of 7.7 cfs with the reservoir at El 192.9. If in addition to the rainfall, the pumps continued to supply 13.9 cfs during the Test Flood, the reservoir would be slightly overtopped.

Overtopping of the reservoir will not occur under the Test Flood unless both pumps are allowed to continue pumping. Since the pool is normally maintained at El 192.0, which is one-half foot lower than the rims of the overflow pipes, the probability of overtopping is very low.

The reservoir has two 12-inch, low-level drains used to lower the water level for maintenance. Drawdown of the reservoir in anticipation of a storm could be achieved by shutting off the pumps and allowing normal outflow by demand to lower the pool.

f. Dam Failure Analysis. The peak discharge rate due to failure was calculated to be 23,600 cfs for a 100-foot long section of the embankment. The total failure head of 27 feet was based on

a pond level of 194.0, which is the rim elevation of the reservoir, and an elevation of 167.0, which is the bottom of the reservoir.

The resulting flood wave would move down Prospect Hill, either toward Prospect Hill Pond if the break occurs on the south side of the reservoir or toward Black Pond if the break occurs on the north side. Water moving toward Prospect Hill Pond would probably damage Prospect Hill Street and could cause flooding of up to four residences southwest of the reservoir along Prospect Hill Street. The location of these structures is not shown on the Location Map since the buildings were built subsequent to the date of the map. Water moving toward Black Pond would not encounter any development.

SECTION 6

STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations. The evaluation of the structural stability of Prospect Hill Reservoir is based on review of available drawings and the visual inspection conducted on November 30, 1978. As discussed in Section 3, Visual Inspection, the dam is in good condition. No seepage or settlement of the embankment was observed, however, some trees are growing on the slopes. Also, it was reported that greater than anticipated seepage was occuring through the underdrain system. Based on this, the embankment is not considered to be a potential hazard.

b. Design and Construction Data. There are 45 sheets of drawings dated September, 1954, and revised as-built in July, 1956, available from the Owner and Zoppo Construction Co. Copies of selected sheets are given in Appendix B (see Figures B-2 through B-6). A copy of the construction specifications and a set of construction photographs are available from Fay, Spofford & Thorndike, Inc. There are no structural or hydraulic computations available from the Owner, State, or County, relative to the design or construction of the reservoir and embankment.

Information does not appear to exist on the type, shear strength, and permeability of the soil and/or rock materials of the embankment. Borrow material for the earth embankment was reportedly sandy gravel obtained from cut sections around the reservoir. The foundation beneath the reservoir is also sandy gravel, and no bedrock was encountered. The embankment is unzoned earth fill with slopes at 2:1 (see typical section on Figure B-3). The embankment was placed in 1-foot layers and compacted mainly with tracked equipment (bull dozers). The project manager on the job recalls that compaction was at least 95 percent. All stones greater than 6 inches in

length were removed prior to compaction. The embankment was constructed in the fall of 1955 and allowed to settle during the winter and spring. The downhill slope is covered with seeded loam, 1 foot thick. The slope into the reservoir is lined with reinforced concrete slabs, 6 inches thick.

c. Operating Records. There is no instrumentation of any type in the embankment at Prospect Hill Reservoir, and no instrumentation was ever installed at this site. The performance of the embankment under prior loading can only be inferred by physical evidence at the site.

d. Post-Construction Changes. Based on field measurements and discussions with personnel from Fay, Spofford & Thorndike, Inc. and Zoppo Construction Co., the embankment appears to be built essentially as shown on the contract drawings. No significant post-construction repairs have been made.

e. Seismic Stability. The dam is located in Seismic Zone No. 2 and in accordance with Phase I "Recommended Guidelines" does not warrant seismic analyses.

SECTION 7

ASSESSMENT, RECOMMENDATIONS, AND REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition. Based upon a review of available drawings, the visual inspection of the site and past performance, there is a need for maintenance and monitoring to assure the continued performance of this structure. Generally, the reservoir and embankment are considered to be in good condition. However, trees are growing on the slope of the embankment, slight leakage is occurring at some joints on conduits in the gate house, and a gate valve is reportedly leaking in the outlet conduit. Also greater than anticipated seepage is occurring in the underdrain system.

Hydraulic analyses indicate that the two 12-inch overflow drains can discharge a flow of 15.1 cfs with the water surface at El 194.0 which is the top of the rim of the reservoir. An outflow test flood of 7.7 cfs (one-half PMF) at El 192.9 will not overflow the reservoir under normal operating conditions.

b. Adequacy. The lack of detailed design and construction data did not allow for a definitive review. Therefore, the evaluation of the adequacy of the reservoir and embankment is based primarily on review of available drawings, visual inspection, past performance and engineering judgment.

c. Urgency. The remedial measures outlined below should be implemented by the Owner within 2 years after receipt of this Phase I Inspection Report.

d. Need for Additional Investigation. Additional investigations to further assess the adequacy of the dam are not required at this time.

7.2 Recommendations. As a result of the visual inspection and a review of available data, more detailed studies of the site are not considered necessary at the present time. Future changes in the reservoir structures or increases in seepage rates in the underdrain system may necessitate further investigations.

Recommendations on repairs and maintenance procedures are outlined below under Section 7.3, Remedial Measures.

7.3 Remedial Measures

a. Operating and Maintenance Procedures. The dam and appurtenant structures are generally well maintained. However, it is recommended that the Owner accomplish the following:

(1) selectively remove trees from the slopes of the earth embankment,

(2) repair leakage from some joints on conduits in the gate house,

(3) repair leakage from a gate valve on the outlet conduit,

(4) monitor and measure the leakage from the underdrain system. Any changes should immediately be evaluated.

(5) conduct periodic technical inspections of the reservoir and appurtenances every two years.

7.4 Alternatives. There are no alternatives to implementing the maintenance procedures listed above.

APPENDIX A

PERIODIC INSPECTION CHECKLIST

PROSPECT HILL RESERVOIR

PERIODIC INSPECTION

PARTY ORGANIZATION

PROJECT Prospect Hill Res. DATE Nov 30 1978

TIME 8:30 - 12.00

WEATHER Partly Sunny

W.S. ELEV. 192.0* U.S. None D.S.

*operational high water level given on the contract drawings

PARTY:

1. R Weber
2. C Sweet
3. H Lurd
4. D Cole
5. W Checchi
6.
7.
8.
9.
10.

	PROJECT FEATURE	INSPECTED BY	REMARKS
1.	Embankment	Weber	
2.	Inlet / Outlet	Weber / Branagan	
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

PERIODIC INSPECTION CHECK LIST

PROJECT Prospect Hill Res DATE Nov 30 1978

PROJECT FEATURE Dam (Reservoir) NAME R. Weber

DISCIPLINE Geotechnical NAME

AREA EVALUATED	CONDITION
DIKE EMBANKMENT	
Crest Elevation	varies from 192.9 to 193.2
Current Pool Elevation	192.0
Maximum Impoundment to Date	unknown
Surface Cracks	None visible
Pavement Condition	No pavement
Movement or Settlement of Crest	None visible
Lateral Movement	None visible
Vertical Alignment	Level
Horizontal Alignment	Rectangular
Condition at Abutment and at Concrete Structures	Good - Dike meets natural ground at crest el. in some areas
Indications of Movement of Structural Items on Slopes	None visible
Trespassing on Slopes	Animals and vandals
Sloughing or Erosion of Slopes or Abutments	Some minor surface erosion Fir trees planted to check erosion
Rock Slope Protection - Riprap Failures	Concrete liner in reservoir
Unusual Movement or Cracking at or near Toes	None visible
Unusual Embankment or Downstream Seepage	None visible at reservoir
Piping or Boils	None visible
Foundation Drainage Features	Underdrain system in bottom of reservoir
Toe Drains	None
Instrumentation System	None

A-2-4

PERIODIC INSPECTION CHECK LIST

PROJECT Prospect Hill Res DATE Nov 30 1978

PROJECT FEATURE Dam (Storage Basin) NAME R. Weber

DISCIPLINE Geotechnical NAME

AREA EVALUATED	CONDITION
DIKE EMBANKMENT	
Crest Elevation	varies from 135.5 to 136.0
Current Pool Elevation	135.5
Maximum Impoundment to Date	unknown
Surface Cracks	None visible
Pavement Condition	No pavement
Movement or Settlement of Crest	Erosion of crest due to overflow
Lateral Movement	None visible
Vertical Alignment	Level
Horizontal Alignment	Triangular
Condition at Abutment and at Concrete Structures	None
Indications of Movement of Structural Items on Slopes	None visible
Trespassing on Slopes	Unknown
Sloughing or Erosion of Slopes or Abutments	Erosion of slope due to overtopping
Rock Slope Protection - Riprap Failures	None
Unusual Movement or Cracking at or near Toes	None visible
Unusual Embankment or Downstream Seepage	None visible
Piping or Boils	None visible
Foundation Drainage Features	Gravel bottom for percolation of water
Toe Drains	None
Instrumentation System	None

PERIODIC INSPECTION CHECK LIST

PROJECT Prospect Hill Res DATE Nov 30 1978

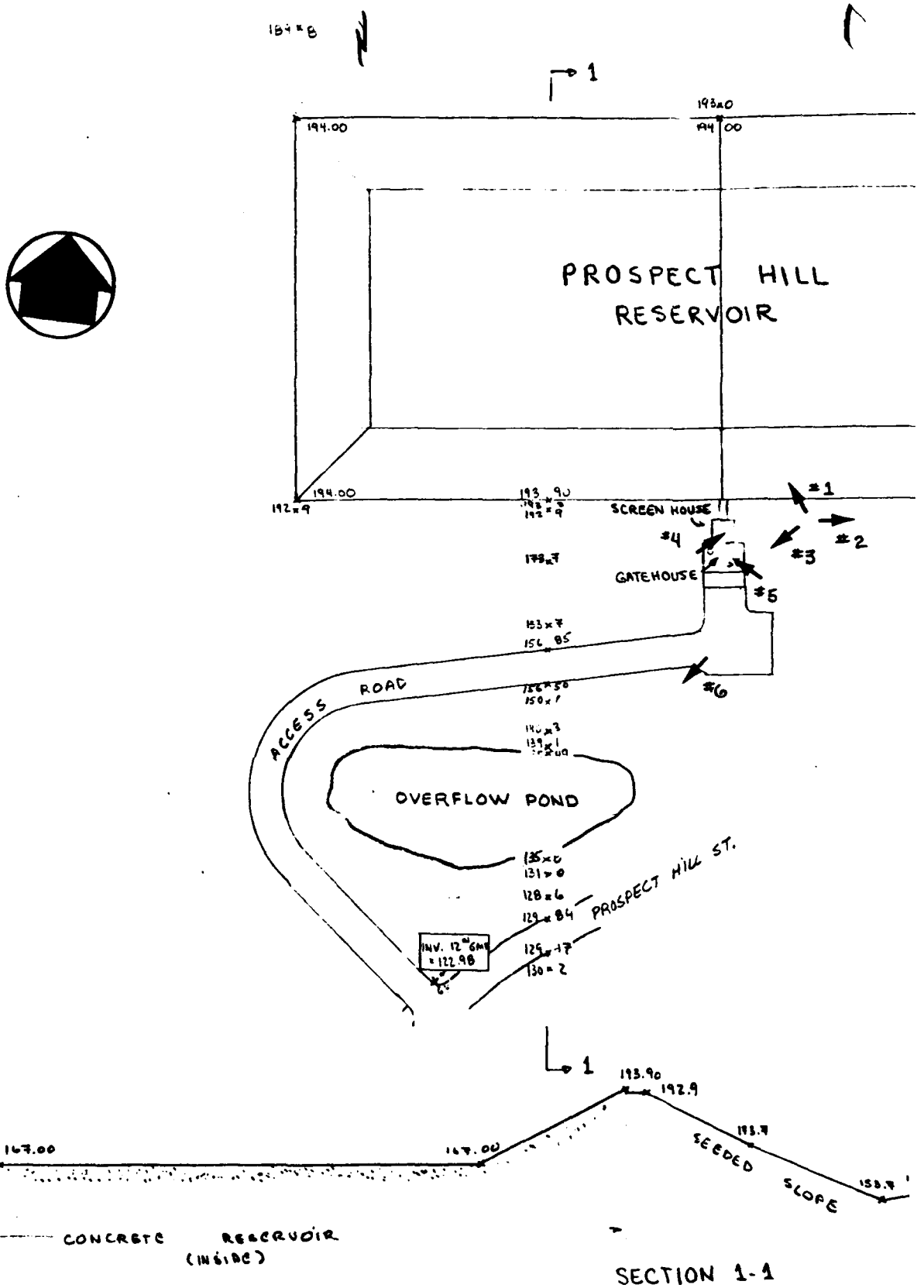
PROJECT FEATURE OUTLET NAME R. Weber

DISCIPLINE Geotechnical NAME L. Branagan

AREA EVALUATED	CONDITION
OUTLET WORKS - CONTROL TOWER	
a. Concrete and Structural	
General Condition	good
Condition of Joints	good
Spalling	none visible
Visible Reinforcing	none visible
Rusting or Staining of Concrete	staining due to leaks at pipes
Any Seepage or Efflorescence	seepage where pipes come through wall also some efflorescence
Joint Alignment	good
Unusual Seepage or Leaks in Gate	none visible
Cracks	few but very minor
Rusting or Corrosion of Steel	none visible
b. Mechanical and Electrical	
Air Vents	
Float Wells	
Crane Hoist	
Elevator	
Hydraulic System	
Service Gates	20-inch valves - hand operated
Emergency Gates	12-inch drains with valves
Lightning Protection System	
Emergency Power System	
Wiring and Lighting System in Gate Chamber	yes

APPENDIX B

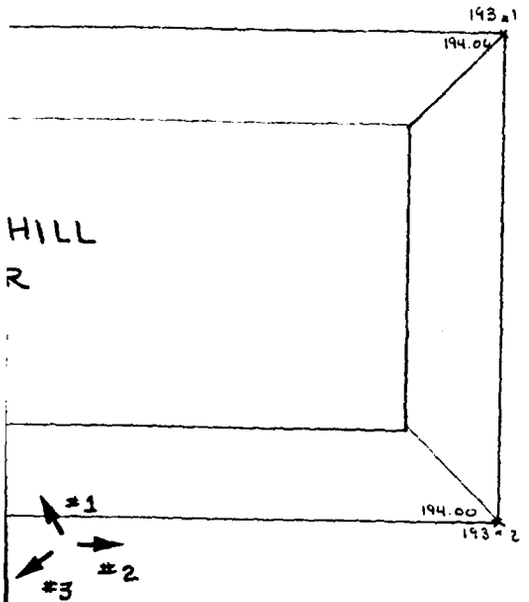
PLANS OF RESERVOIR



SECTION 1-1

SCALE IN FEET

0 50 100



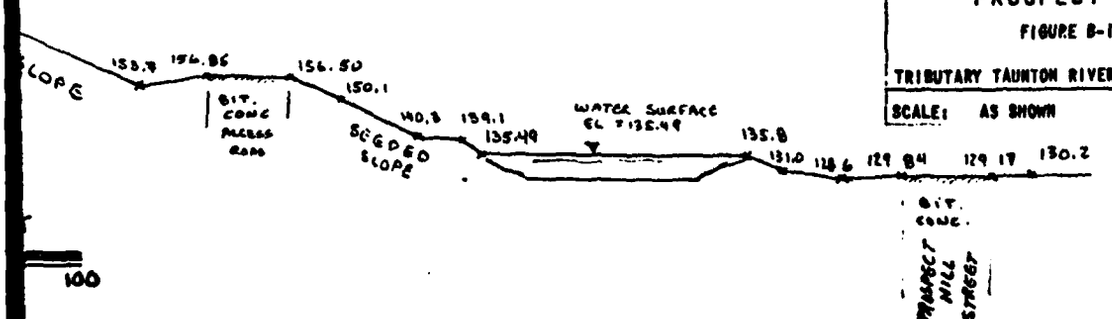
PLAN SCALE

IN FEET

0 100 200

NOTES:

1. ELEVATIONS SHOWN ARE REFERENCED TO TOP CENTERWALL ELEV. 194.0 (MSL).
2. INFORMATION SHOWN BASED ON FIELD SURVEY OF NOVEMBER 30, 1978; AND CONTRACT DRAWINGS DATED SEPTEMBER, 1954.
3. #2 INDICATES LOCATION AND DIRECTION OF VIEW FOR PHOTOGRAPHS



METCALF & EDDY, INC. ENGINEERS BOSTON, MA.	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MA.

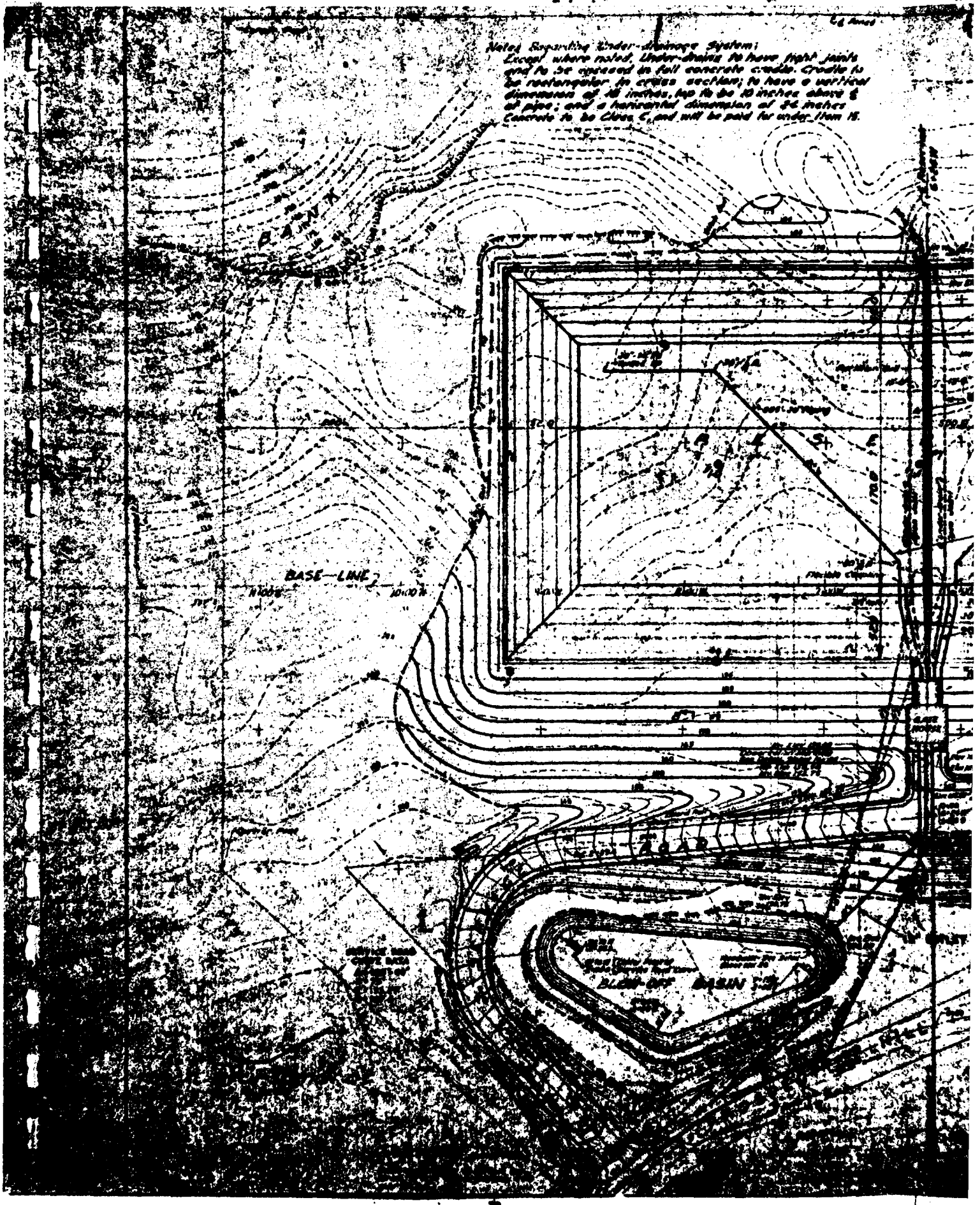
NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

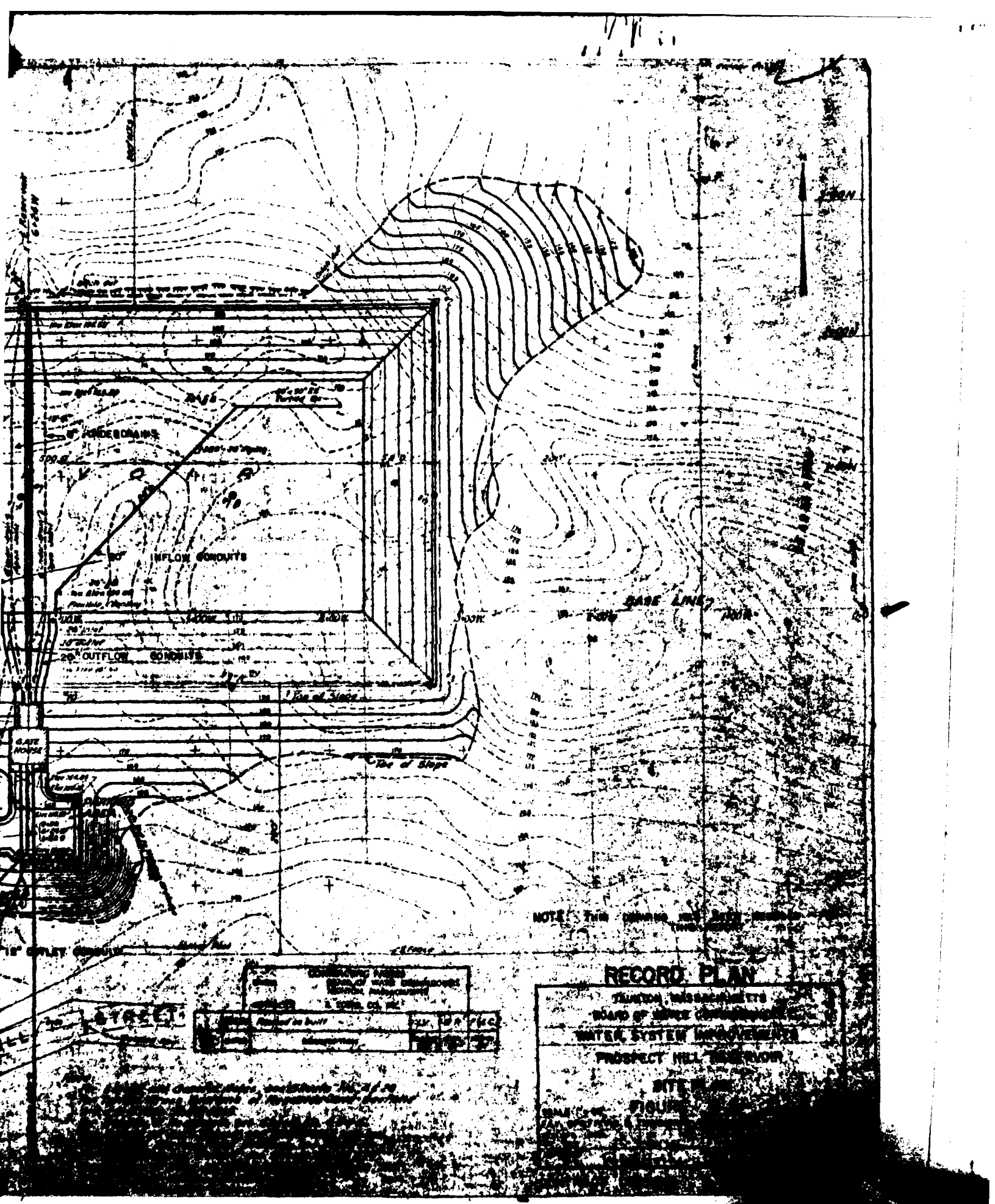
PROSPECT HILL RESERVOIR

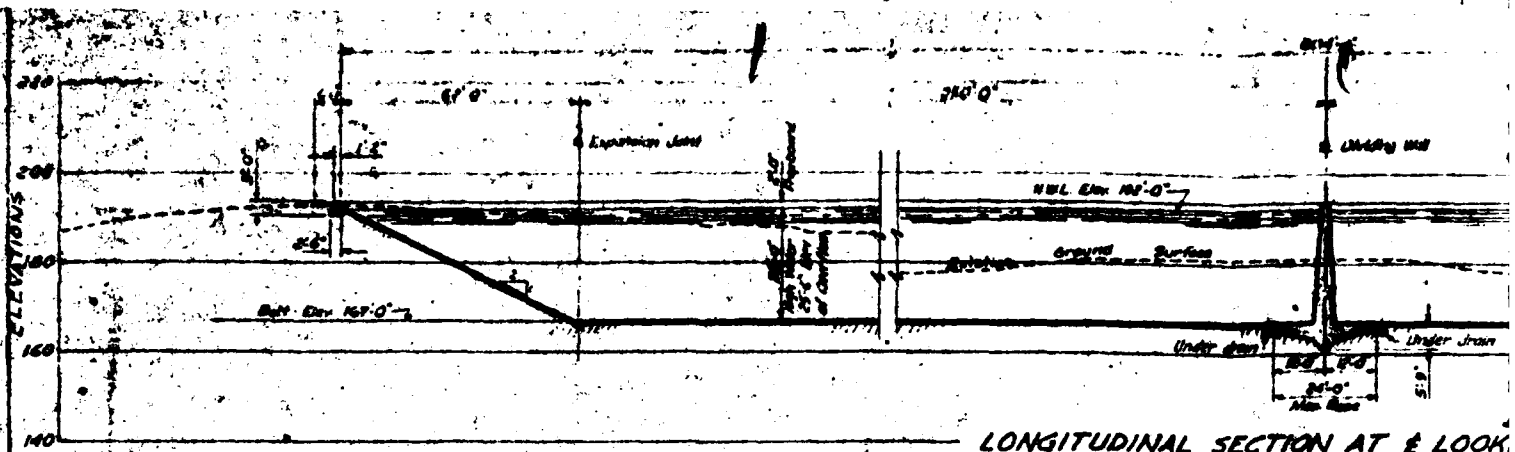
FIGURE B-1 PLAN OF RESERVOIR

TRIBUTARY TAUNTON RIVER MASSACHUSETTS

SCALE: AS SHOWN DATE: JANUARY, 1979

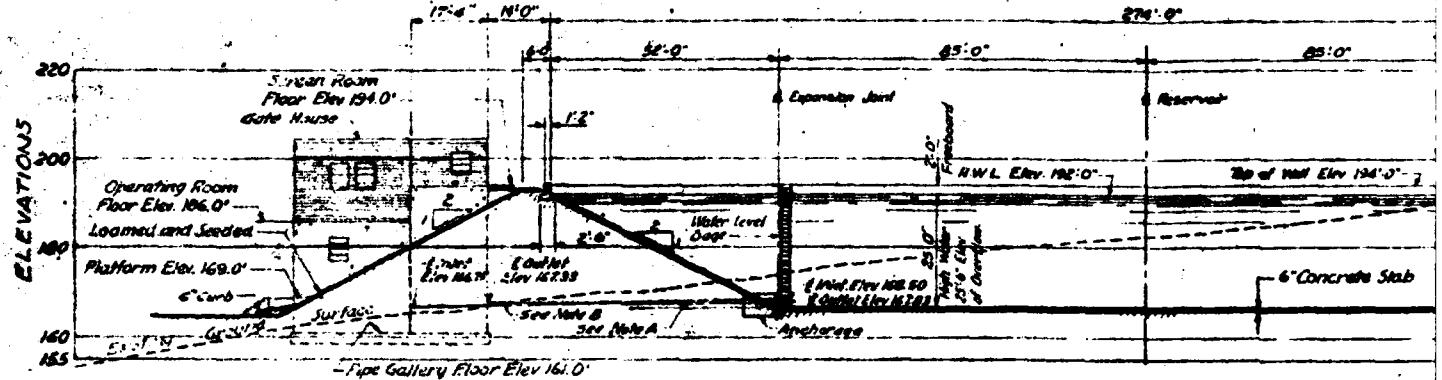

Note: Regarding Under-drainage System:
Except where noted, Under-drains to have tight joints and to be opened in full concrete cradle. Cradle to be rectangular in cross section; to have a vertical dimension of 18 inches, top to be 10 inches above ϕ of pipe; and a horizontal dimension of 24 inches. Concrete to be Class C, and will be paid for under Item 18.
BASE LINE
BASIN


INFLOW CONDUITS
OUTFLOW CONDUITS
GATE HOUSE
BASE LINE
RECORD PLAN
WATER SYSTEM IMPROVEMENTS
PROSPECT HILL RESERVOIR



LONGITUDINAL SECTION AT ℄ LOOK

Scale: Hor. 1" = 20'
Vert. 1" = 20'



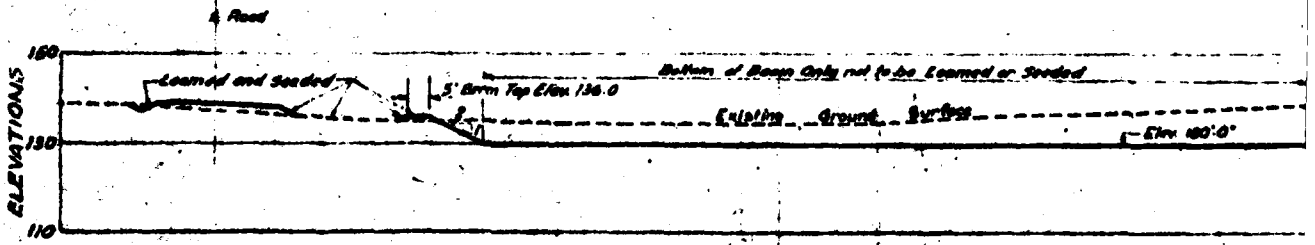
TRANSVERSE SECTION LOOKING WEST

Scale: Hor. 1" = 20'
Vert. 1" = 20'

NOTE A: 8 of 20' outlet from reservoir to be laid with cast iron flexible joint pipe having wall thickness of 1.03" (2 required) See sheet No 2 for plan of 2 outlet lines.

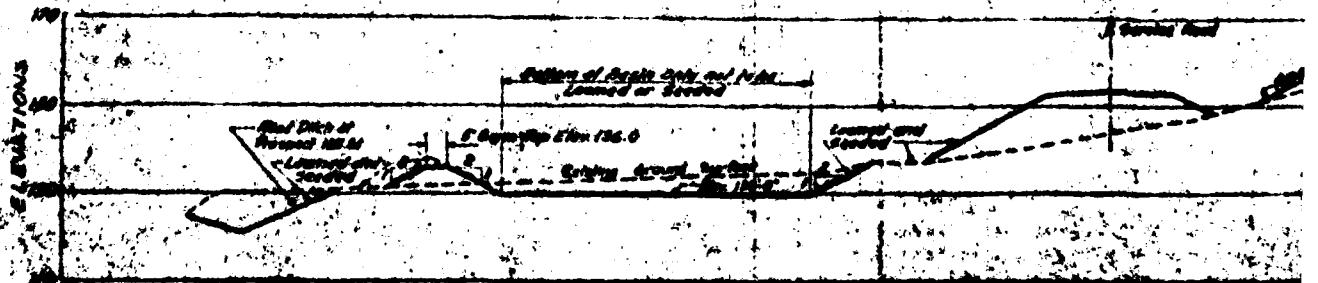
NOTE B: 8 of 20' inlet to reservoir to be laid with cast iron flexible joint pipe having wall thickness of 1.03" (2 required) See sheet No 2 for plan of 2 inlet lines.

See sheets No 6 and 14 for details of anchorages to Reservoir and at terminal points of Gate House.



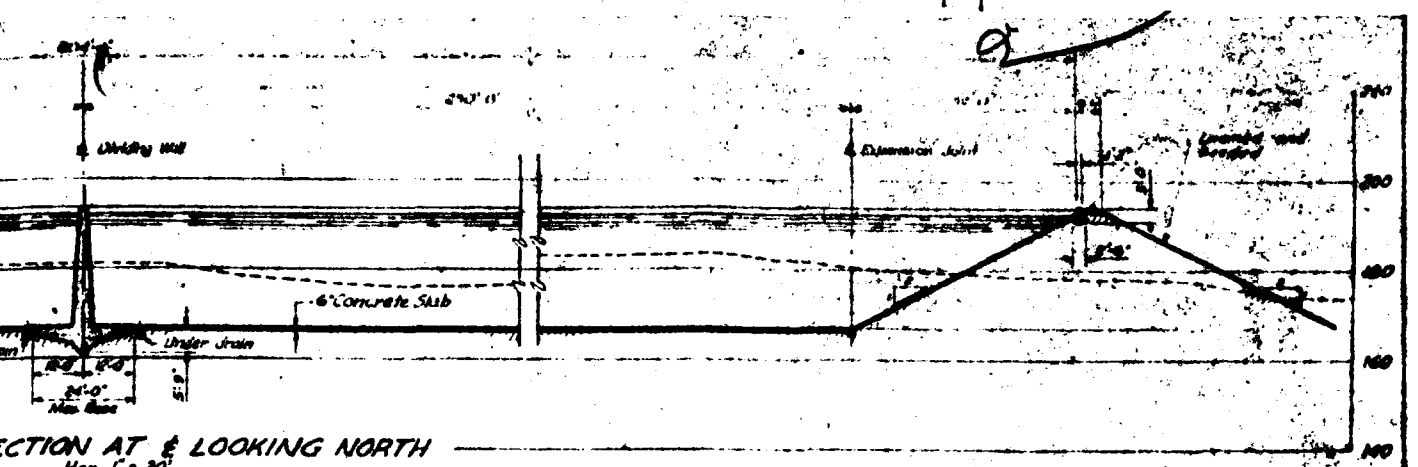
SECTION A-A THRU BLOW-OFF BASIN

Scale: Hor. 1" = 20'
Vert. 1" = 20'

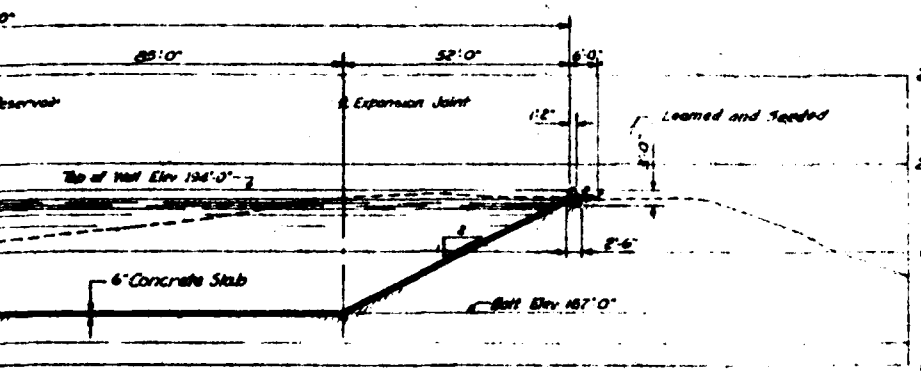


SECTION B-B THRU BLOW-OFF BASIN

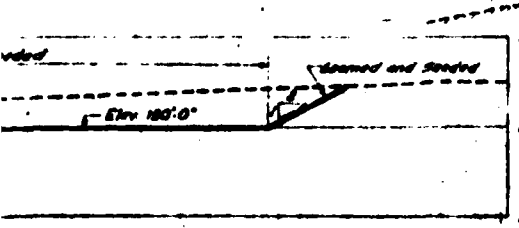
Scale: Hor. 1" = 20'
Vert. 1" = 20'



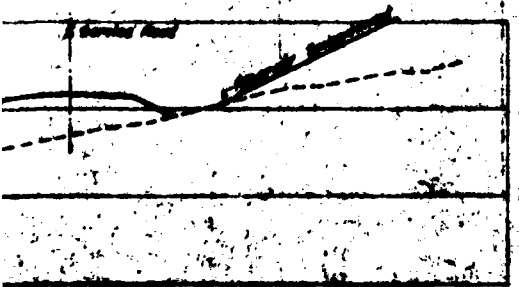
ECTION AT ℄ LOOKING NORTH
Scale: Hor. 1" = 20'
Vert. 1" = 20'



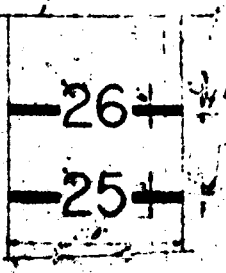
N LOOKING WEST
1" = 20'
1" = 20'



IN



TYPICAL DETAIL OF
EMBANKMENT SHOWING TOPSOILING
Not to Scale



DETAIL OF
WATER LEVEL GAGE
Scale: 1" = 1'-0"

Note
For Legend and General Notes, see Sheets No. 4 & 5.
For Plan of Reservoir, see Sheets No. 1 & 3.
For Location of Sections A-A & B-B, see Sheet No. 2.

CONTRACTING PARTIES

RECORD PLAN

TAUNTON, MASSACHUSETTS

BOARD OF WATER COMMISSIONERS

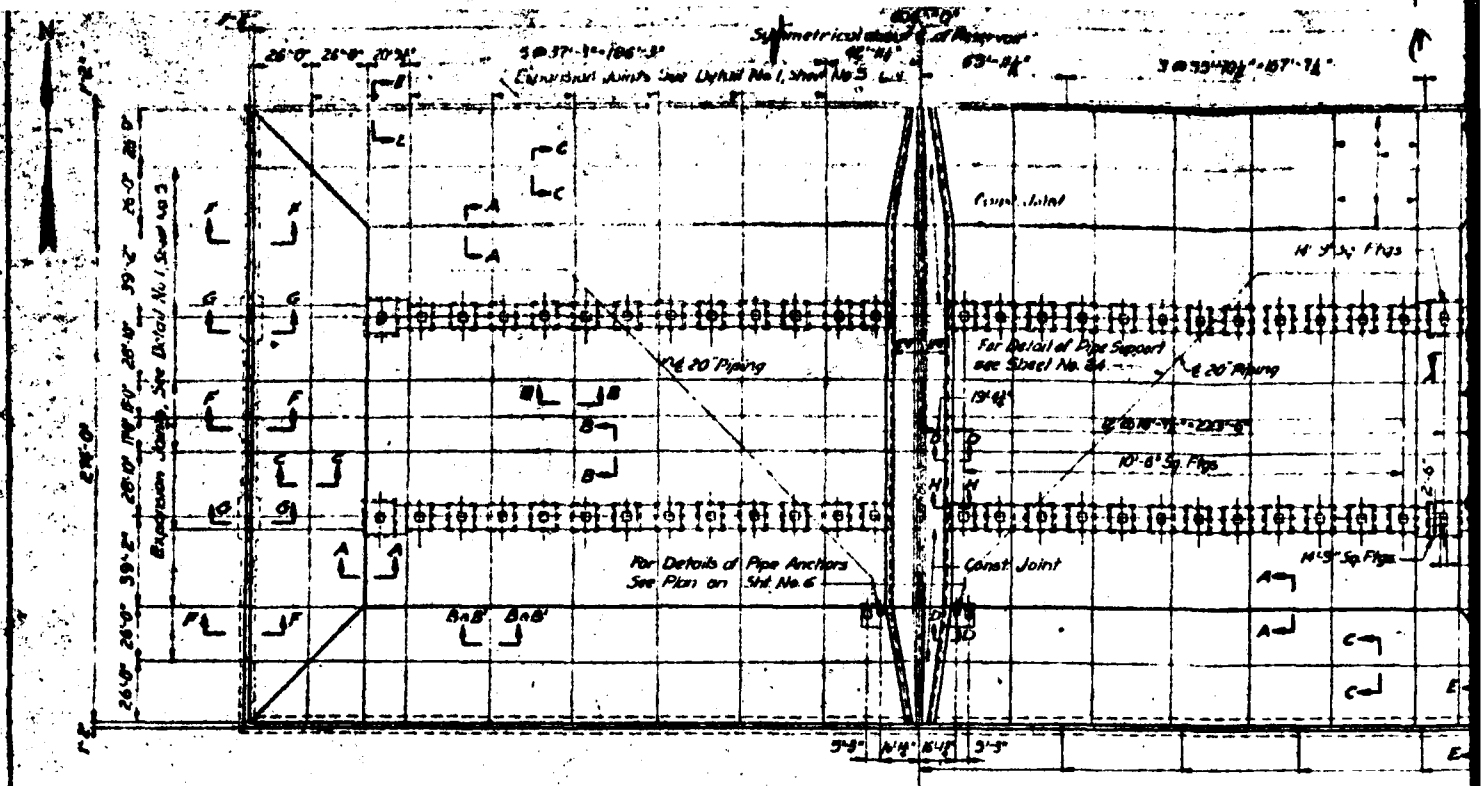
WATER SYSTEM IMPROVEMENTS

PROSPECT HILL RESERVOIR

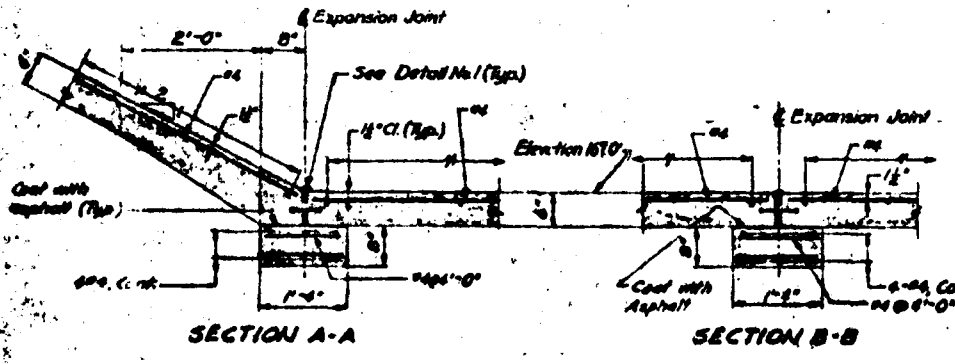
LONGITUDINAL & TRANSVERSE SECTIONS

FIGURE

CONTRACT DRAWING

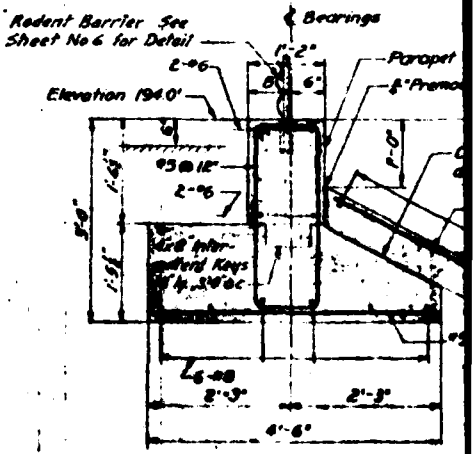


PLAN
Scale: 1" = 40'

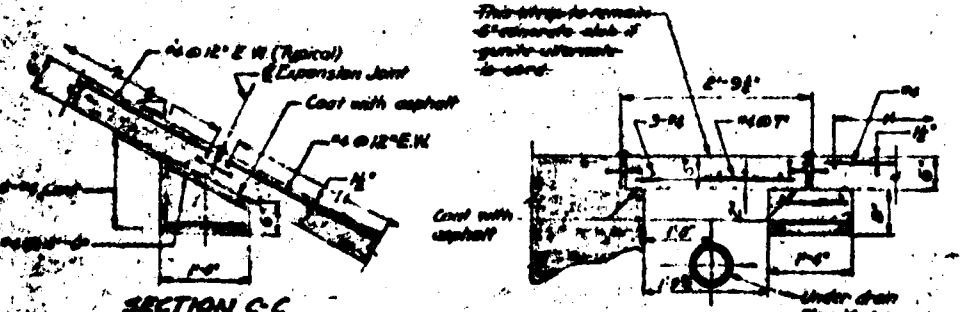


SECTION A-A
SECTION B-B

Note-For Alternate Gunite Details, see Sheet No 6

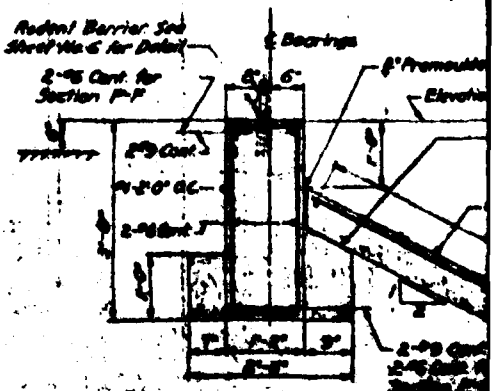


SECTION G-G
Scale: 3/8" = 1'-0"

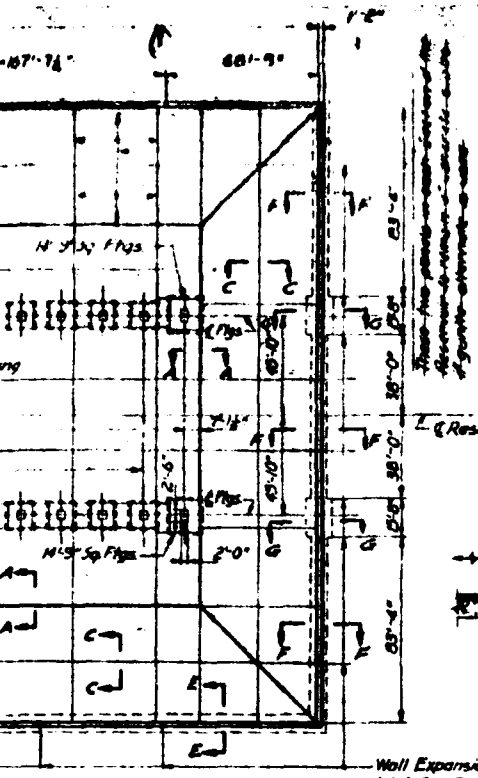


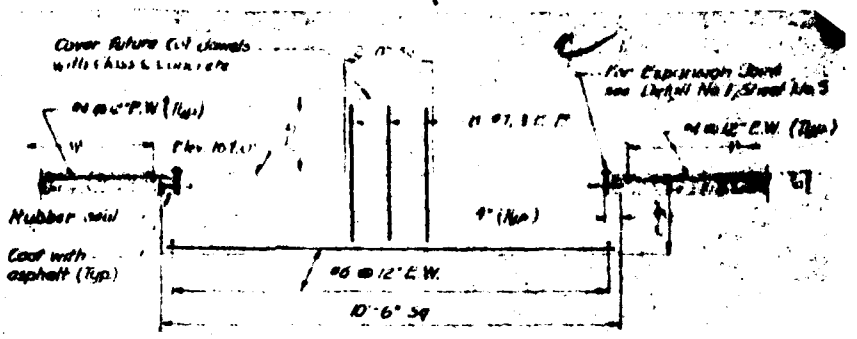
SECTION C-C
SECTION D-D

TYPICAL SILL DETAILS
Scale: 3/4" = 1'-0"

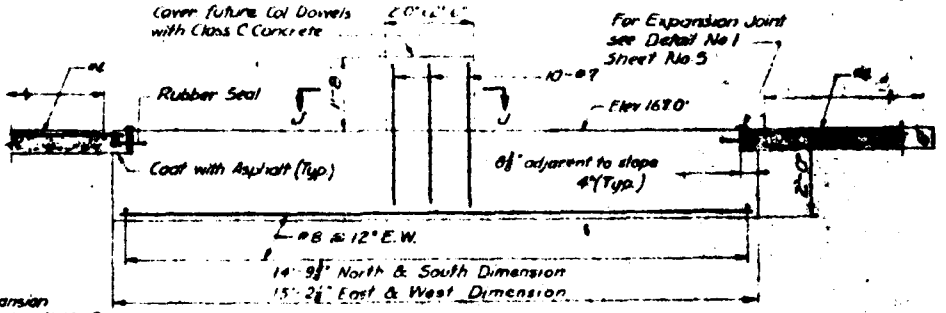


SECTION E-E

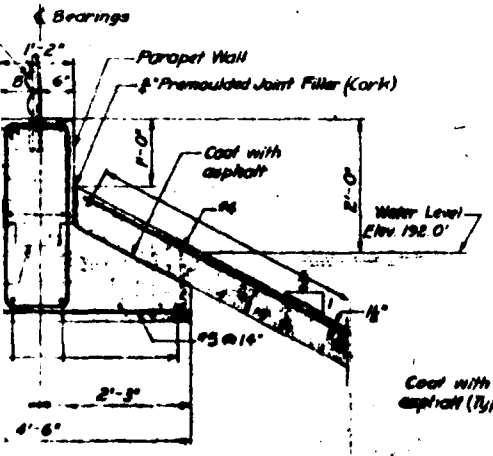




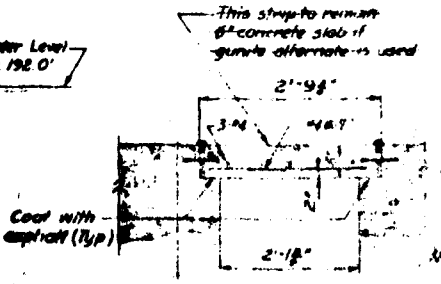
ELEVATION
(10'-6" Square Footing for Future Column)
48 Required
Scale 1/2" = 1'-0"



ELEVATION
(14'-9⅞" x 15'-2⅛" Footing for Future Column)
4 Required
Scale 1/2" = 1'-0"



TION G-G
e: 3/4" = 1'-0"



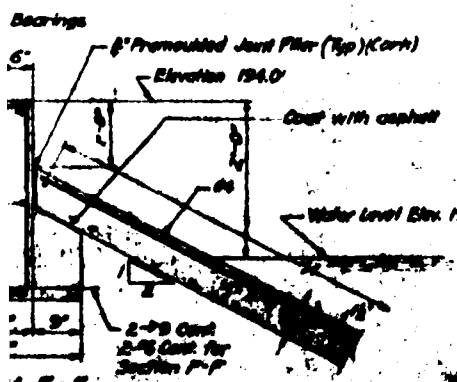
SECTION H-H
Scale 3/4" = 1'-0"

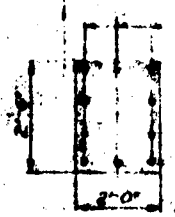
GENERAL NOTES

1. All Concrete to be Class A unless otherwise noted
2. Unless otherwise shown, clear distance from face of concrete to face of reinforcing bars to be: Foundations on or against soil - 3". Elsewhere - 2"
3. Lap continuous reinforcement 30 diameters at splices.
4. Allowable soil bearing 3000 lbs. per sq. ft.

Note:
For Legend and Additional General Notes, see Sheet No. 2A
For Section A-B, see Sheet No 6
For Additional Sections and Details, see Sheets No. 8 & 9

NOTE: THIS DRAWING HAS BEEN REDUCED FOR THIS REPORT





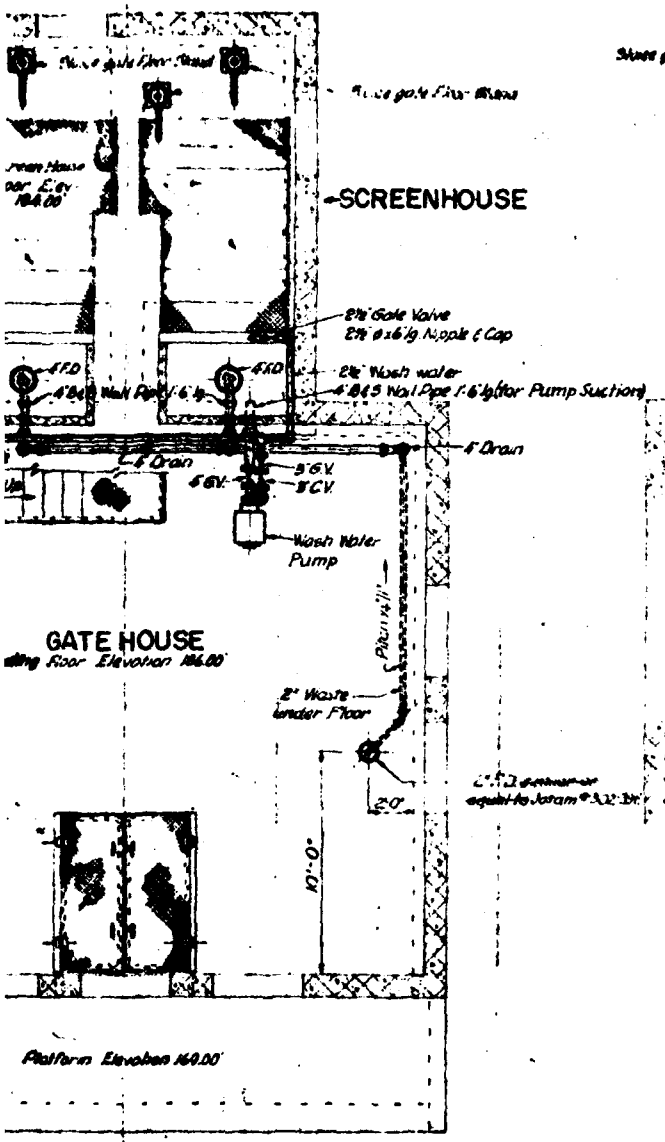
SECTION J-J
Scale 3/4" = 1'-0"

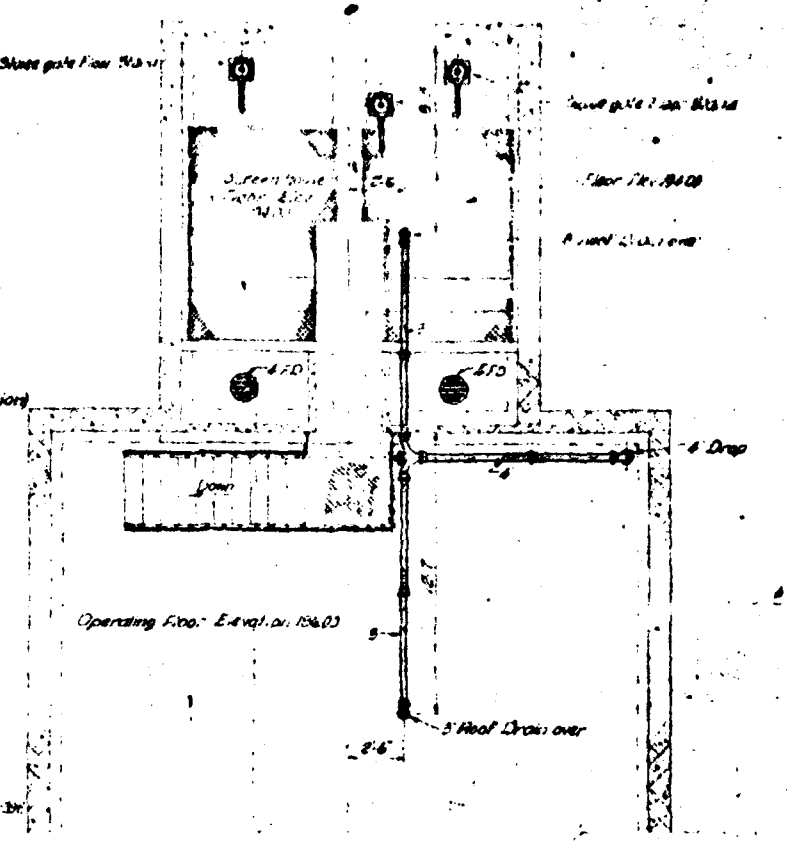
E-E
as Noted

RECORD PLAN

TAUNTON, MASSACHUSETTS
BOARD OF WATER COMMISSIONERS
WATER SYSTEM IMPROVEMENTS
PROSPECT HILL RESERVOIR
STRUCTURAL DETAILS

LOW LEVEL DRAINS
INFLOW CONDUIT
INFLOW CONDUIT
OUTFLOW CONDUITS
OUTLET CONDUIT
WATER SUPPLY PIPELINE
WATER SUPPLY PIPELINE
GATE HOUSE
Operating Floor Elevation 186.00
PLAN AT E-E
Scale: 1/8" = 1'-0"
PLAN AT D-D
Scale: 1/8" = 1'-0"
Data for Concrete Pipe Supports
Line Size
Location
L
L'
20"
Run of Pipe
10'-0"
10'-0"
20"
Tee
8'-0"
8'-0"
20"
Elbow
5'-0"
5'-0"
36"
Gate Valve
6'-0"
8'-0"
16"
Gate Valve
4'-0"
5'-0"
16"
Reducer
7'-0"
7'-0"
16"
Run
6'-0"
7'-0"
12"
Run
5'-0"
6'-0"
Steel pipe collar supports



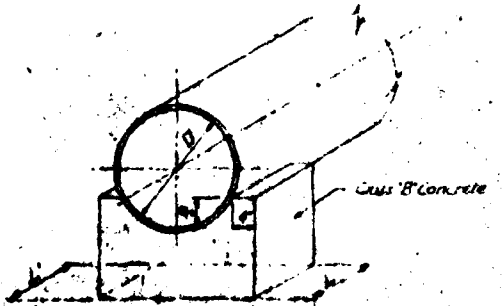


PART PLAN AT F-F
Scale ¼" = 1'-0"

PLAN AT E-E
Scale: ¼" = 1'-0"

Pipe Supports		
	L	L'
	7'-0"	7'-0"
	2'-6"	2'-6"
	7'-0"	5'-0"
	10"	10"
	9"	9"
	7'-0"	7'-0"
	7'-0"	7'-0"
	7'-0"	7'-0"
	5'-0"	7'-0"

Steel pipe column supports



DETAIL OF CONCRETE PIPE SUPPORTS
Scale: Not to Scale

CONTRACT PLANS
CONTRACT NO. 1
BOARD OF WATER COMMISSIONERS
TAUNTON, MASS.
CONTRACTOR: R. ZOPPO CO., INC.

Note:
For Legend and General Notes, see Sheets No. 8 & 24
For Electrical Plan, see Sheet No. 16.
For Section A-A, B-B & C-C, see Sheet No. 15.

NOTE: THIS DRAWING HAS BEEN REDUCED FOR THIS REPORT

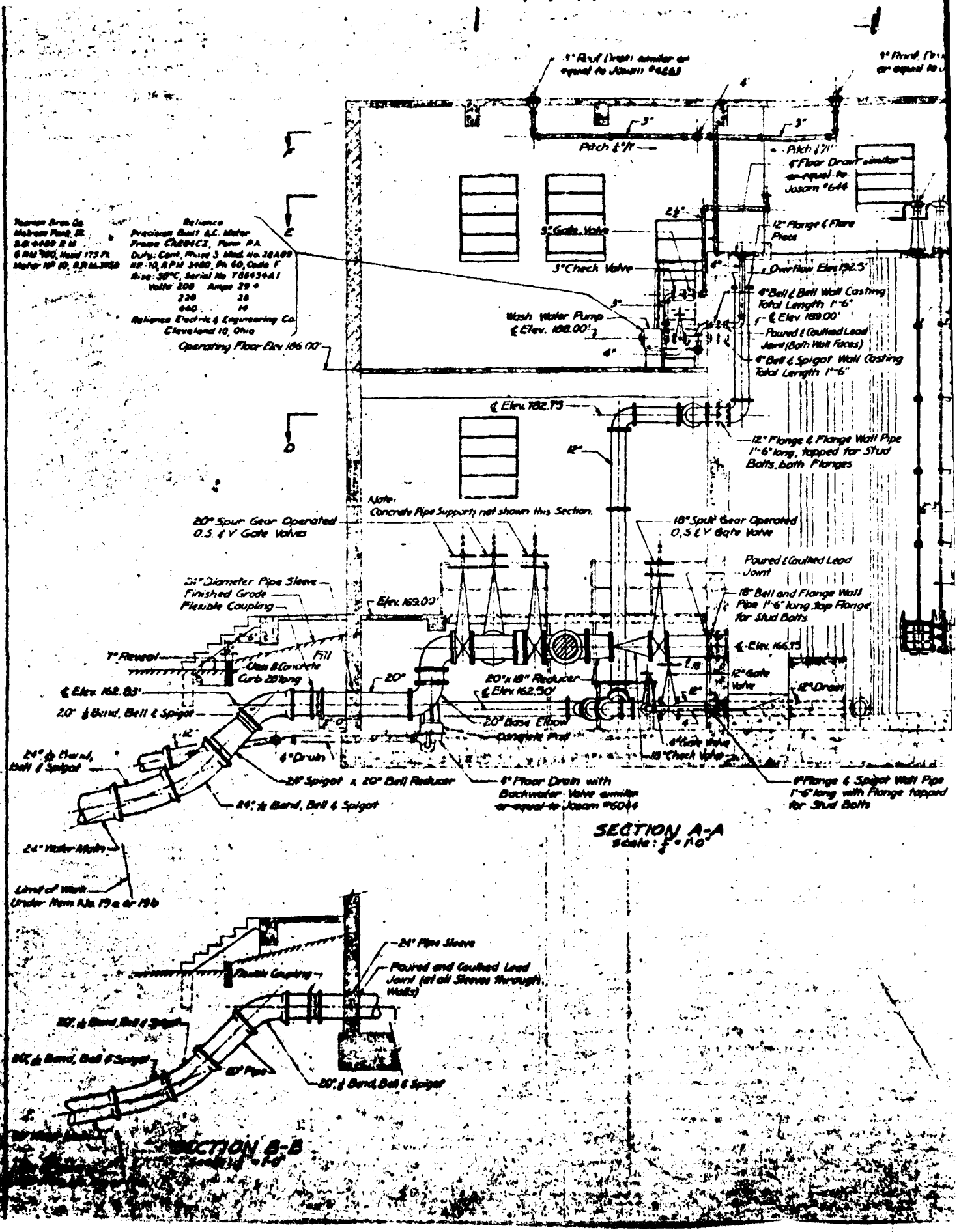
Concrete Pipe Supports indicated thus: [▭]

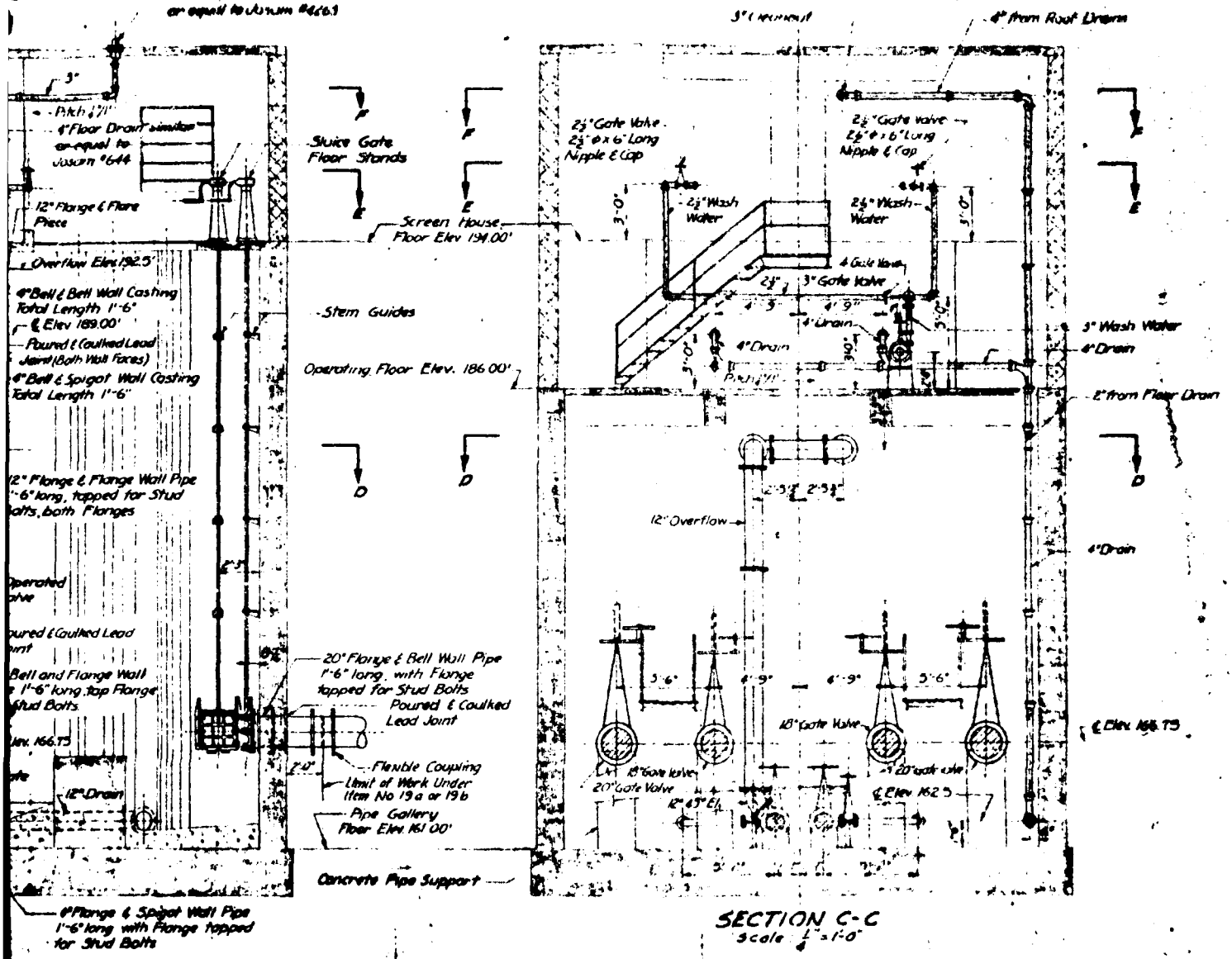
NO.	DATE	REVISION	BY
1	7/28/54	Revised as Built	C.V.

RECORD PLAN

TAUNTON, MASSACHUSETTS
BOARD OF WATER COMMISSIONERS
WATER SYSTEM IMPROVEMENTS
PROJECT NO. 1

SCALE AS NOTED
FAY, SPOFFORD & THORNDIKE
CONTRACT


9" Roof Drain similar or equal to Josam #6283
3"
Pitch ¼"/ft
Pitch ¼"/ft
6" Floor Drain similar or equal to Josam #646
2½"
5" Gate Valve
12" Flange & Flare Piece
3" Check Valve
4"
Overflow Elev 192.5'
Wash Water Pump ℄ Elev. 188.00'
3"
4"
4" Bell & Bell Wall Casting Total Length 1'-6" ℄ Elev. 189.00'
Poured & Caulked Lead Joint (Both Wall Faces)
6" Bell & Spigot Wall Casting Total Length 1'-6"
Operating Floor Elev 196.00'
℄ Elev. 182.75
12" Flange & Flange Wall Pipe 1'-6" long, tapped for Stud Bolts, both Flanges
12"
Note: Concrete Pipe Supports not shown this Section.
20" Spur Gear Operated O.S. & Y Gate Valves
18" Spur Gear Operated O.S. & Y Gate Valve
Poured & Caulked Lead Joint
24" Diameter Pipe Sleeve
Finished Grade
Flexible Coupling
Elev. 169.00'
18" Bell and Flange Wall Pipe 1'-6" long, tap Flange for Stud Bolts
℄ Elev. 166.75
1" Reveal
Fill
Class B Concrete Curb 28" long
20"
20" x 18" Reducer ℄ Elev. 162.50'
18"
12" Gate Valve
12" Drain
℄ Elev. 162.83'
20" ℄ Bend, Bell & Spigot
20" Base Elbow Concrete Pad
6" Gate Valve
18" Check Valve
24" ℄ Bend, Bell & Spigot
4" Drain
24" Spigot x 20" Bell Reducer
8" Floor Drain with Backwater Valve similar or equal to Josam #6046
6" Flange & Spigot Wall Pipe 1'-6" long with Flange tapped for Stud Bolts
24" ℄ Bend, Bell & Spigot
24" Water Main
Limit of Work Under Item No. 19a & 19b
SECTION A-A
Scale: ½" = 1'-0"
24" Pipe Sleeve
Poured and Caulked Lead Joint (at all Sleeves through Walls)
Flexible Coupling
20" ℄ Bend, Bell & Spigot
20" Pipe
20" ℄ Bend, Bell & Spigot
SECTION B-B
Scale: ½" = 1'-0"



SECTION C-C
Scale 1/4" = 1'-0"

Note
For Legend and General Notes, see Sheets No 8 of 24.
For Location of Sections A-A, B-B, C-C, Plan at D-D, E-E and Part Plan at F-F, see Sheet No 10.

1	3/31/71	Revised as built	J.P.	W.R.	F.B.C.
No.	DATE	DESCRIPTION	DRAWN BY	CHKD. BY	APPD. BY

RECORD PLAN

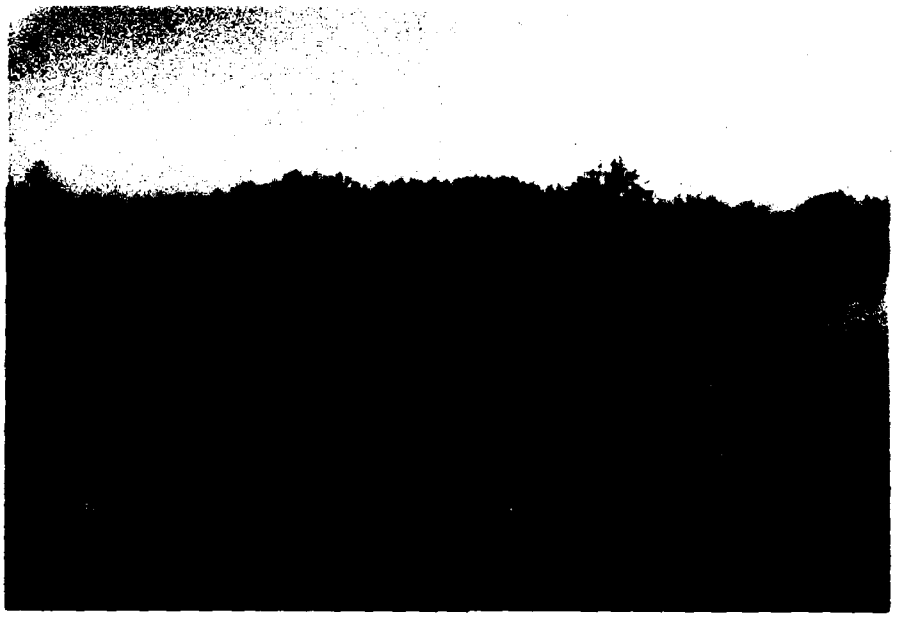
NOTE THIS DRAWING HAS BEEN REDUCED FOR THIS REPORT

TAUNTON, MASSACHUSETTS
BOARD OF WATER COMMISSIONERS
WATER SYSTEM IMPROVEMENTS
PROSPECT HILL RESERVOIR
GATE HOUSE
SECTIONS
SCALE AS NOTED
FAY, SPOFFORD & THORNDIKE
DES. J.P.B. / DWN.
CK'D.
APPROVED
CONTRACT DRAWING

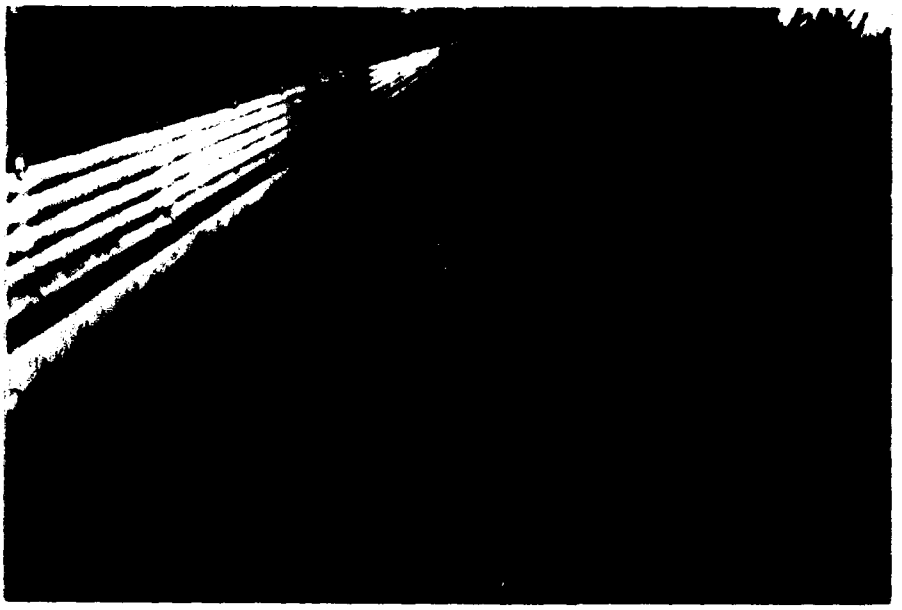
APPENDIX C

PHOTOGRAPHS

PROSPECT HILL RESERVOIR

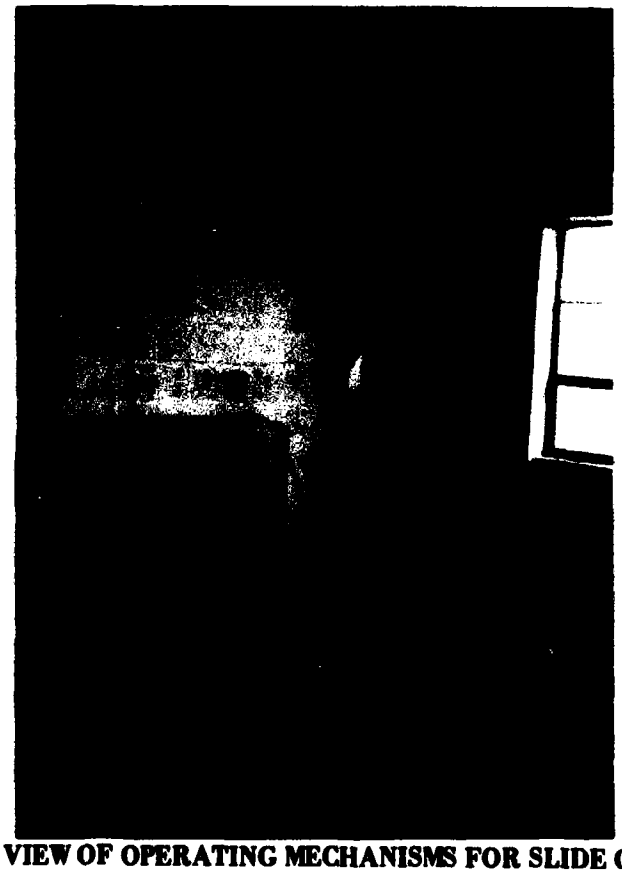


NO. 1 VIEW OF CONCRETE WALLS OF RESERVOIR

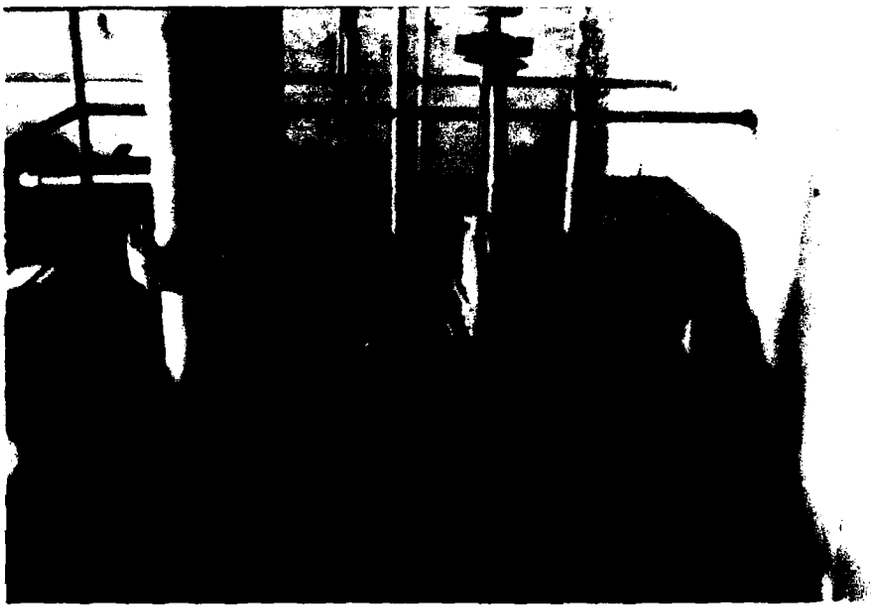


NO. 2 VIEW OF CREST AND SLOPE OF EMBANKMENT

NO. 3 VIEW OF GATE HOUSE ON SOUTH SIDE OF RESERVOIR



NO. 4 VIEW OF OPERATING MECHANISMS FOR SLIDE GATES



NO. 5 VIEW OF OUTFLOW PIPE SHOWING GATE CONTROL AND CHECK VALVE

NO. 6 VIEW OF OVERFLOW BASIN

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

PROSPECT HILL RESERVOIR

Project Nat. Review of Non Fed. Dams Acct. No. 6191 Page 1 of 4
Subject Bristol County Area Comptd. By LEB Date 12/29/78
Detail PROSPECT HILL RES. Ck'd. By RW Date 1/11/79

(I) Test Flood

A. Rainfall Inflow (6 hr. storm)

Hour Ending	Full P.M.P. (Prob. Max. Precip.) Increm. Rain (in.)	Rain Rate in/hr.	Half P.M.P. Increm. Rain (in.)
1	1.52	1.52	0.76
2	1.71	1.71	0.86
3	1.90	1.90	0.95
3:30	3.61	7.22	1.81
4	5.70	11.40	2.85
5	3.04	3.04	1.52
6	1.52	1.52	0.76

Size: Small ; Hazard: Significant , Test Flood: 100yr to ½PMF

Use ½ PMF - for rain inflow without losses this is same as ½ P.M.P.

B- Pumped Inflow

Taunton Water Dept. data indicates that the Prospect Hill Res. was supplied by 1-5.5 m.g.d. pump and 1-3.5 mgd pump, at the most. (Other pumps primarily serve other areas)

∴ Max Pumped Inflow = 9 m.g.d. = 13.9 cfs. or 1.15 ac.ft./hr
For 6 hr. rainfall period, total vol. = 6.90 ac. ft.

(II) Discharge Ratings

A - Outlet Pipe

2 - Vert. 12"ϕ outlets w/ent. flared to 18"±., Ent.c. k_m - Say $C_D \simeq 0.98$

$$Q_o = A_o C_D \sqrt{2gH_o} = 2(.785)(.98)\sqrt{64.4\,H_o} = 12.36\,H_o^{1/2}$$

P.r - Crest @ El. 192.5, Perim. Wall @ El. 194 (±)

Res El.	192.75	193	193.5	194	194.05	194.07
H_o	0.25	0.5	1.0	1.5	1.55	1.57
Q_o	6.2	8.7	12.34	15.1	15.4	15.5
ac.ft/hr	0.51	0.72	1.02	1.25	1.28	1.28
inches/hr	1.61	2.27	3.22	3.94	← in 3.8 acre reservoir only	

B - Crest Flow (Perimeter Wall)

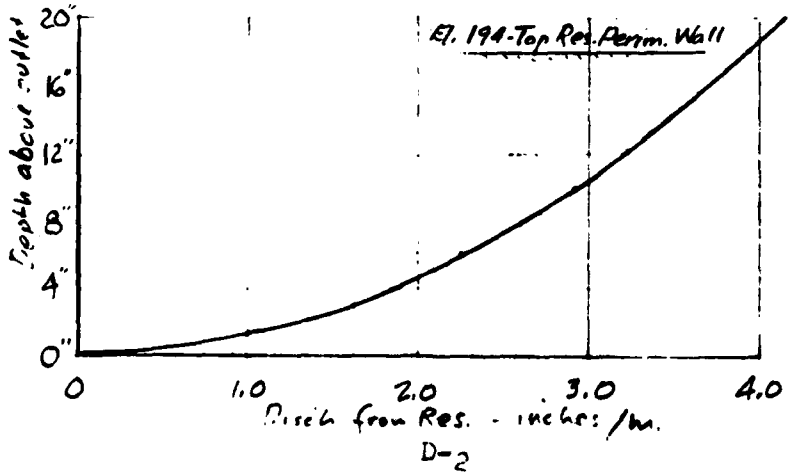
Res. area is 604' x 274' - Total length = 1756 ft
Assume 50% of length is effective, Crest El. 194±

Use $q = 2.55\,H_c^{1.5}$ [Ref.: V.T. Chow "Op. Chan. Hydr" pg 52]

$\therefore Q_c = 2239\,H_c^{1.5}$

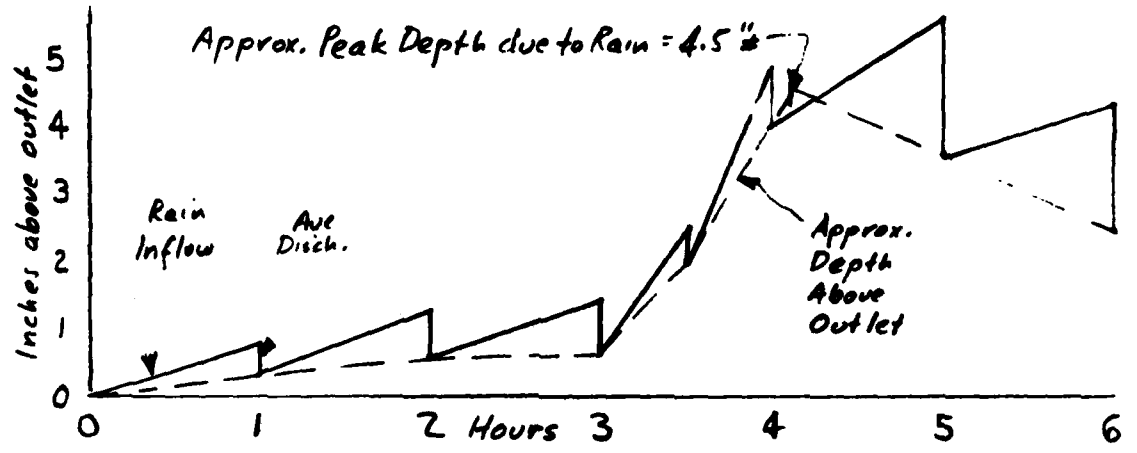
Res. El.	194.02	194.05	194.07
Q_c	6.33	25.03	41.47

C - Plot of Outlet Pipe Disch. vs. Head



Project Nat. Review of Non Fed Dams Acct. No. 6191 Page 3 of 4
Subject Bristol County Area Comptd. By LEB Date 1/9/79
Detail PROSPECT HILL RES. Ck'd. By RW Date 1/11/79

(III) Reservoir Storage



Time	Inches of Rain In (½ PMP)	Ave Depth (in)	Ave Disch (in.)	Final Depth (in.)
0→1 hr	0.76	0.38	0.4	0.36
1→2 hr.	0.86	0.79	0.7	0.52
2→3 hr.	0.95	1.00	0.8	0.67
3→3.5 hr	1.81	1.58	0.5	1.98
3.5→4.0 hr.	2.85	3.40	0.85	3.98
4→5 hr.	1.52	4.74	2.0	3.50
5→6 hr.	0.76	3.88	1.8	2.46
	Σ = 9.51		Σ = 7.05	

Max. Depth for Excess Pumping = 18" - 4.5" = 13.5" - over 4.1 hours
Vol. = 3.8 ac. $\left(\frac{13.5}{12}\right)$ = 4.275 ac. ft. ... ÷ 4.1 = 1.04 ac. ft/hr.
1.04 ac. ft./hr. = 12.58 c.f.s. = 8.1 m.g.d. < 9 m.g.d max. pump inflow

Project Nat Review of Non Fed Dams Acct. No. 6191 Page 4 of 4
Subject Worcester Mass. Area Comptd. By LEB Date 12/20/78
Detail PROSPECT HILL RESERVOIR Ck'd. By RW Date 1/11/79

(IV) Failure of Dam

Peak Failure Flow:

Pond Elevation - 194.0 (Top Wall)
Toe Elevation — 167.0 (Bot. of Res.)
Y_o = 27.0

Dam Length Subject to Breaching = 250'

$W_o = 40\%(250) = 100$

$$Q_{P_1} = 1.68\, W_o\, (Y_o)^{1.5} = 1.68(100)(27)^{1.5} = 23{,}600 \text{ cfs}$$

Storage Volume Released:

Storage Above Spillway N/A
Storage Below Spillway $[250(170) + 302(274)]27 = 77.6$ ac. ft.
S = Total Storage = 77.6

Channel Hydraulics:

There is no channel.

Time to Drain:

$$\frac{43560\ (77.6)}{3600(\frac{1}{2})(23{,}600)} = 0.08 \text{ Hours. or } 4.8 \text{ Minutes}$$

APPENDIX E

INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS

PROSPECT HILL RESERVOIR

INVENTORY OF DAMS IN THE UNITED STATES

(1) IDENTITY NUMBER	(2) DIVISION	(3) STATE	(4) COUNTY	(5) CONGR DIST.	(6) STATE	(7) COUNTY	(8) CONGR DIST.	(9) NAME	(10) LATITUDE (NORTH)	(11) LONGITUDE (WEST)	(12) REPORT DATE DAY | MO | YR
MD	[illegible]	MA	005	10				PROSPECT HILL RESERVOIR	4154.3	7105.9	31JAN79

(13) POPULAR NAME	(14) NAME OF IMPOUNDMENT

(15) REGION	(16) BASIN	(17) RIVER OR STREAM	(18) NEAREST DOWNSTREAM CITY–TOWN–VILLAGE	(19) DIST FROM DAM (MI.)	(20) POPULATION
01	1 B	[illegible]	TAUNTON	0	42100

(21) TYPE OF DAM	(22) YEAR COMPLETED	(23) PURPOSES	(24) STRUCTURAL HEIGHT (FT.)	(25) HYDRAULIC HEIGHT (FT.)	(26) IMPOUNDING CAPACITIES MAXIMUM (ACRE–FT.)	(27) IMPOUNDING CAPACITIES NORMAL (ACRE–FT.)	DIST	OWN	FED R	PRV/FED	SCS A	VER/DATE
[illegible]	1956	S	25	25	77	70	FED	N	N	N	N	21FEB79

(28) REMARKS

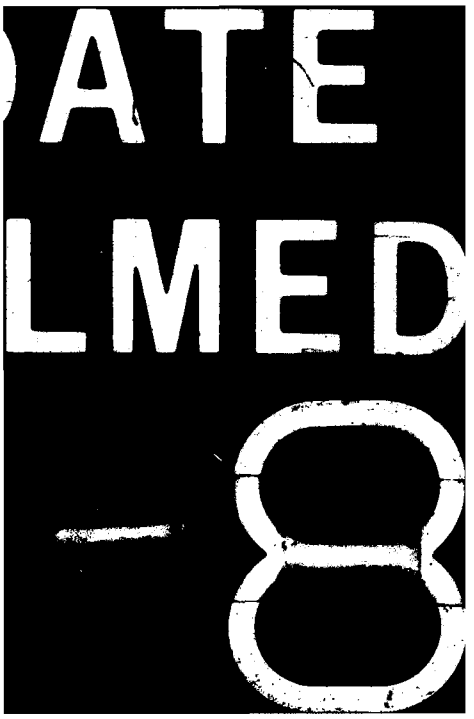
(29) D/S HAS	(30) SPILLWAY LENGTH	(31) TYPE	(32) WIDTH (FT.)	(33) MAXIMUM DISCHARGE (FT)	(34) VOLUME OF DAM (CY)	(35) POWER CAPACITY INSTALLED (MW)	(36) POWER CAPACITY PROPOSED (MW)	(37) NAVIGATION LOCKS NO.	(38) LENGTH (FT.)	(39) WIDTH (FT.)	(40) LENGTH (FT.)	(41) WIDTH (FT.)	(42) LENGTH (FT.)	(43) WIDTH (FT.)	(44) LENGTH (FT.)	(45) WIDTH (FT.)
Y					18000											

(46) OWNER	(47) ENGINEERING BY	(48) CONSTRUCTION BY
[illegible]	RAY SPOFFARD & THORNTIKE	R ZOPPO CONSTRUCTION CO.

(49) REGULATORY AGENCY DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
FOR	FOR	FOR	FOR

(50) INSPECTION BY	(51) INSPECTION DATE DAY | MO | YR	(52) AUTHORITY FOR INSPECTION
STATE AND FED INS	30NOV78	PUBLIC LAW 92-367

(53) REMARKS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